EARLY YEARS

NATIONAL CURRICULUM 5 –16

GCSE

GNVQ

GCE A LEVEL

NVQ

OTHER VOCATIONAL QUALIFICATIONS

First published in 2000

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KEY STAGE 3

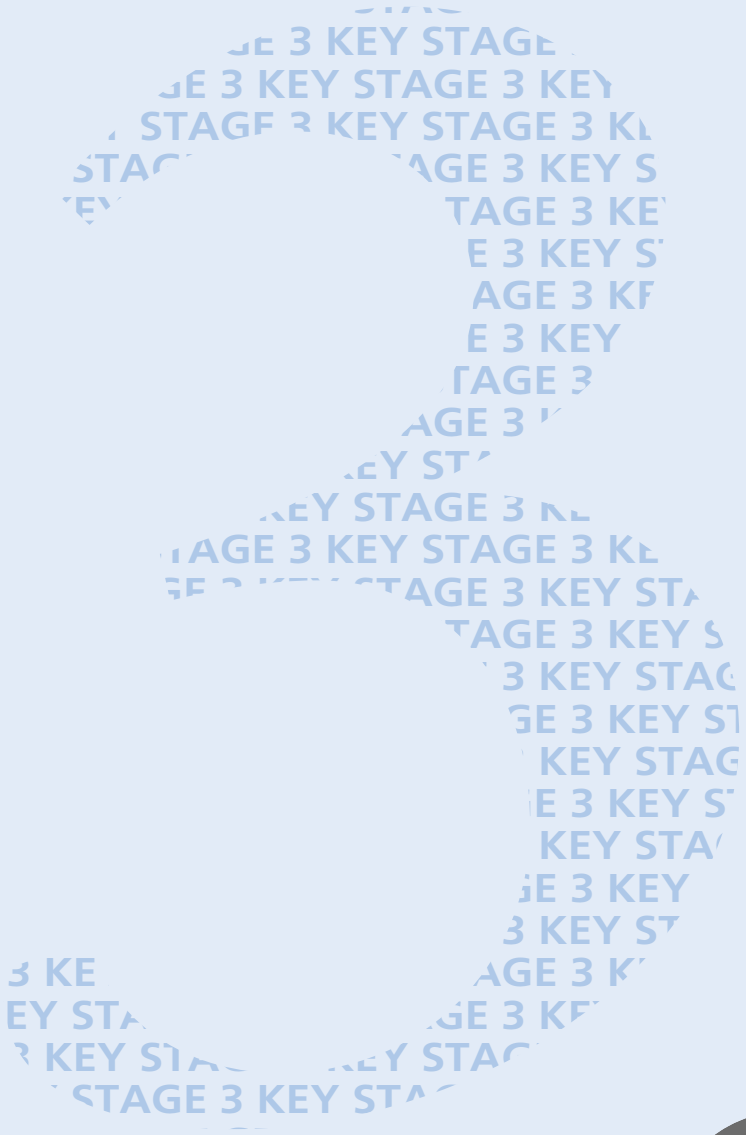
ALL TIERS

2000

Mathematics tests

Mark scheme for Paper 1

Tiers 3-5, 4-6, 5-7 and 6-8



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Introduction

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

This booklet contains the mark scheme for paper 1 at all tiers. The paper 2 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 which are unacceptable. Other guidance, such as when 'follow through' is allowed, is provided as necessary.

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.

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 below with the prescribed correct action. Unless otherwise specified in the mark scheme, markers will 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, and if still uncertain contact the supervising marker.
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'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 without altering the original intention or difficulty level of the question. For each misread that occurs, deduct one mark only.
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 are 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>

General guidance

Throughout the marking of the key stage 3 mathematics tests, the following general guidelines should be observed unless specific instructions to the contrary are given. This guidance reflects decisions made to ensure fairness and consistency of marking.

Responses involving probability

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

	Accept ✓	Take care ! Do not accept ×
For example: *0.7*	✓ 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

Responses involving money

	Accept ✓	Do not accept ×
For example: *£3.20* *£7*	✓ 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 ✓ 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 or ambiguous use of pounds or pence eg £320, £320p or £700p, or 3.20 or 3.20p not in answer space. × 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 the use of algebra

	Accept ✓	Take care ! Do not accept ×
For example: *2 + n* *n + 2* *2n*	✓ 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 time

	Accept ✓	Take care ! Do not accept ×
A time interval *For example:* *2 hours 30 min*	✓ Any unambiguous indication eg 2.5 (hours), 2h 30 ✓ Digital electronic time ie 2:30 Note that 2:30 is accepted for 2h 30m because it is a common electronic expression (eg the time interval shown on an oven timer).	× Incorrect or ambiguous time interval eg 2.3(h), 2.30, 2-30, 2h 3, 2.30min ! 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*	✓ 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 × Incorrect placement of divisors, spaces, etc or incorrect use or omission of 0 eg 840, 8:4:0, 084, 84

Responses involving co-ordinates

	Accept ✓	Do not accept ×
For example: *(5, 7)*	✓ 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)

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 and 6-8, and a total of 121 marks in tier 5-7. The extension paper carries 41 marks.

Awarding levels

The sum of the marks gained on paper 1, paper 2 and the mental arithmetic paper determines the level awarded. A copy of the level threshold tables which show the mark ranges for the award of different levels will be sent to each school by QCA in July 2000.

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 2000 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		**Milk Shakes**	
1					**Correct response**	**Additional guidance**
a				**1m**	**9**	✗ *Incomplete processing* eg, for part (b) • 10 + 12
b				**1m**	**22**	
c				**1m**	**11**	
d				**1m**	**4**	

Tier & Question						
3-5	4-6	5-7	6-8		**Three Coins**	
2					**Correct response**	**Additional guidance**
				3m	All 6 entries correct (see below)	✓ *Coins in any order*
				or **2m**	Any 4 or 5 correct entries	✓ *Trials for 18p that are unambiguously rejected* eg • 10p crossed out.
				or **1m**	Any 3 correct entries	! *Entries made for 10p, 11p and 13p* Ignore.
					12p | 10 1 1 or 5 5 2 13p 14p | 10 2 2 15p | 5 5 5 16p | 10 5 1 17p | 10 5 2 18p | ✗ (ie not possible)	! *Incorrect response alongside correct response* Ignore any incorrect response. ✗ *No decision taken for 18p* eg • Entry for 18p left blank.

Tier & Question						
3-5	4-6	5-7	6-8		**Time**	
3					**Correct response**	**Additional guidance**
a				**1m**	**7:55**	
b				**1m**	**33**	
c				**1m**	**14:20**	

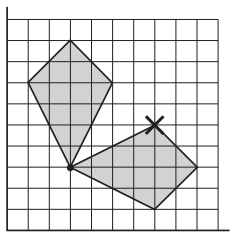
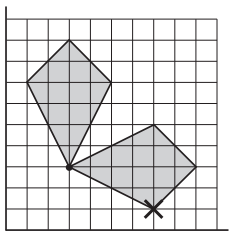
Tier & Question						Sums
3-5	4-6	5-7	6-8			
4					Correct response	Additional guidance
				1m	14	
				1m	645	
				1m	144	
				1m	27	

Tier & Question						Calendar
3-5	4-6	5-7	6-8			
5					Correct response	Additional guidance
a				1m	Tuesday	✓ *Unambiguous abbreviation* eg • Tues • Tu ✗ *Ambiguous abbreviation that could refer to Thursday* eg • T
b				1m	30 (th)	✓ *Unambiguous indication* eg • Marking of diagram.
c				1m	122	

Tier & Question						Sixty-fives
3-5	4-6	5-7	6-8			
6	1				Correct response	Additional guidance
a				1m	325	
				1m	6	
	a			1m	780	
				1m	1300	
b	b			2m	1040	
				or 1m	Shows a reasonably efficient correct method, even if there are processing errors eg ■ 8 × 65, then doubled. ■ 10 × 65 add 6 × 65 ■ 390 + 650 ■ Added 4 of them, to 2 of them, to 10 of them. ■ Their 12 × 65 + 260 ■ 130 × 8 ■ 520 + 520	! *Method uses long multiplication* Accept, provided there is not more than one processing error. ! *Method uses repeated addition from 650* Accept provided there is not more than one computational error. The correct intermediate values are: 715 780 845 910 975 × *Method uses repeated addition without building on from 650, or better* eg ◆ Adding 65 sixteen times. ◆ Adding 130 eight times. ◆ Adding 260 four times. ! *Follow through from part (a)* For 2m or 1m, where a pupil has used, unambiguously, an incorrect answer from 12 × 65 or 20 × 65 to calculate 16 × 65, allow follow through. For example, suppose their 12 × 65 = 723, accept for 2m ◆ 723 + 260 = 983 However, it must be clear from the working that this incorrect value has been used, hence in this example do not accept 983 without working.

Tier & Question					Spinners	
3-5	4-6	5-7	6-8			
7	2				**Correct response**	**Additional guidance**
a	a			**1m**	**Spinner A** with **a correct reason** The most common correct reasons refer to: **Fewer numbers / sections / sides** on A eg ▪ A, less digits. ▪ B has more numbers. ▪ A has one piece missing. ▪ A has only 5 sides, not 6 ▪ A because B has 6 triangles. or **Greater probability** on A eg ▪ The probability is $\frac{1}{5}$ not $\frac{1}{6}$ ▪ A has a bigger probability. or **Bigger angles** on A eg ▪ Each triangle on B has a smaller angle in the middle.	✓ *Minimally acceptable reason* eg ◆ There's 5 not 6 ◆ Gaps on A are bigger than on B ! *Use of 'bigger' or 'smaller' without qualification* Ignore eg, accept ◆ A, less numbers and A is smaller than B eg, do not accept ◆ A is smaller (or bigger) than B ✓ *A correct probability but expressed in words* At this level, accept eg ◆ Spinner A is 1 out of 5 ! *A 'correct' probability expressed as a ratio* In parts (a) and (b), penalise the first occurrence only eg ◆ In (a), 1 to 5 (or 1 to 4), with reason ◆ In (b), 1 to 6 (or 1 to 5), with reason Mark as 0, 1 ! *Use of 'chance' with a descriptor* As this restates the question asked, do not accept unless accompanied by a correct response. ✗ *Incorrect probability* Do not accept, even if accompanied by a correct response. ✓ *Minimally acceptable reason* eg ◆ A's triangles are wider. ! *Reference to force of spin* Ignore eg, accept ◆ Depends how hard you spin it, but A has a 1 in 5 chance.

Tier & Question					Spinners (cont)	
3-5	4-6	5-7	6-8			
7	2				Correct response	Additional guidance
b	b			**1m**	**Doesn't matter** with a **correct reason** The most common correct reasons refer to: **Same numbers / sections / sides** eg ▪ Both numbered 1 to 6 ▪ Same amount of numbers. ▪ Same shape. or **Same probability** eg ▪ Both $\frac{1}{6}$ ▪ C is same probability as B ▪ Same chance. or **Same angles** eg ▪ Both 60°	✓ *Minimally acceptable reason* eg ◆ Same numbers. ◆ Both have only one 3 ◆ Same gaps. ! *Use of 'different size' without qualification* Ignore eg, do not accept ◆ It doesn't matter even though they are different sizes. ◆ Doesn't matter if one is bigger than the other. ! *A correct probability incorrectly expressed* Mark as part (a) of this question eg, accept ◆ Both spinners are 1 in 6 ✓ *Minimally acceptable reason* eg ◆ The triangles are the same width.
c	c			**2m** *or* **1m**	**Two 3s** and **three 4s** in any order. Partially correct, ie exactly two 3s seen. or Exactly three 4s seen.	

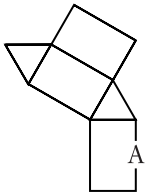
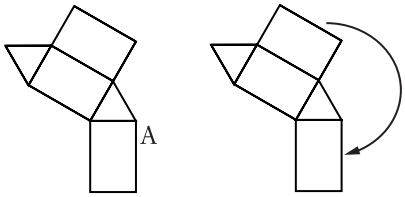
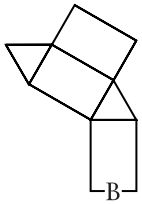
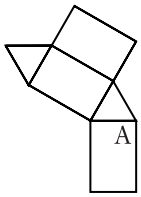
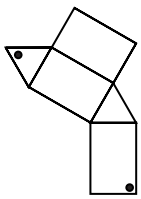
Tier & Question					**Shapes**	
3-5	4-6	5-7	6-8			
8	**3**				**Correct response**	**Additional guidance**
a	a			**1m**	Both correct, ie ☑ ☐ ☐ ☑ ☐	
b	b			**1m**	**(5 , 7)**	✓ *Co-ordinates of A given alongside B* eg • (3,3 , 5,7) ✓ *Label included within the co-ordinates* eg • (B5, 7)
c	c			**1m**	Correct place eg ▪ 	✓ *Place identified by correct co-ordinates* ! *Label rather than point identified* Accept any indication, eg cross or B, provided it is nearer to the correct co-ordinate than to any other co-ordinate with integer values.
d	d			1m	Correct place eg ▪ 	

Tier & Question					Birthdays	
3-5	4-6	5-7	6-8			
9	**4**				**Correct response**	**Additional guidance**
a	a			**1m**	**21**	
b	b			**1m**	**1989** or **89**	! *Follow through as 2010 – (a)* Accept provided their (a) > 12 and is not a multiple of 10
c	c			**1m**	**1995** or **95**	✓ *Follow through as part (b) + 6* ✓ *Correct birth date or month given* eg • 15.3.95 • March 95

Tier & Question					Rainfall	
3-5	4-6	5-7	6-8			
10	**5**				**Correct response**	**Additional guidance**
a	a			**1m** **1m**	**Tuesday** **Friday**	✓ *Any unambiguous indication* eg • 0.8 for Tuesday • 0.05 for Friday
b	b			**1m**	**0.25**	
c	c			**1m** **1m**	**1.5** Their number of cm converted to mm	

Tier & Question				*Marking overlay available*	**Angles**	
3-5	4-6	5-7	6-8			
11	**6**	**1**			**Correct response**	**Additional guidance**
a	a	a		**1m**	Q	✓ *Unambiguous indication* eg • Second.
b	b	b		**2m**	Angle within ± **2°**, unambiguous eg, using an end point of the given line, or starting again ▪ ▪ eg, cutting the given line ▪	
				or **1m**	Angle within ± 4°, unambiguous or Using end point or starting again: correct angle drawn ± 2°, but reflex angle indicated eg ▪ or Cutting the given line: correct angle drawn ± 2°, but no, or incorrect, indication of which angle to choose eg ▪ ▪ or Draws the supplement to ± 2° eg ▪	

Tier & Question					Angles (cont)	
3-5	4-6	5-7	6-8			
11	6	1			**Correct response**	**Additional guidance**
c	c			**1m**	**38** with explanation that focuses on **most frequent** eg ▪ More of them. ▪ Mode. ▪ Most. ▪ Twice as many said 38 as the others put together. ▪ 10 people aren't likely to be wrong.	✓ *Minimally acceptable explanation* eg ◆ 10 people measured it. ✓ *Correct response accompanied by an incorrect, irrelevant or ambiguous statement* eg ◆ More people chose it and it's the middle number. ◆ It's the average, there's more of them. × *Use of 'average' without a correct response* eg ◆ It's the average.
		c		**1m**	**135** with **correct explanation** The most common correct explanations are: 135 being the mode / median / mean when 45° removed eg ▪ 10 said about 135, only half of that said 45 so it's 135 ▪ 45 is too different, 135 most likely. ▪ Discard 45, then 135 is the average. ▪ 45 is too different, then 135 is in the middle. or That 45 is due to incorrect reading of the scale eg ▪ The 45s are errors, 135 most likely. ▪ 135 is the mode. The 45s are probably reading the scale incorrectly. ▪ 135 lies by 45 which is the wrong side.	✓ *Minimally acceptable explanation referring to 45* eg ◆ 45 is too different to the others, so 135 ◆ 135, fewer people but 45 is nothing like the rest. ! *Minimally acceptable explanation that does not refer to 45* The explanation must justify why 135 chosen rather than 134 or 136 eg, accept ◆ Most of them are around 135 ◆ 135 is between 134 and 136 × *Misinterpreting the table or other incorrect or ambiguous response* eg ◆ Only *1* said 45, *3* said 134-136, and 135 is in the middle of them so it's 135 ◆ Out of 3, 4 and 5, 4 is the middle so 135 ◆ The average is 3 but there are 2 answers with 3 so I chose 135 as it's in-between. ◆ Most of them are 135 (no reference to 45 or around 135) ◆ 135 is the middle of the table (no reference to 45)

Tier & Question						
3-5	4-6	5-7	6-8		**Prism**	
12	**7**	**2**			**Correct response**	**Additional guidance**
a	a	a		**1m**	Correct edge, ie 	✓ *Unambiguous indication or use of different labels* eg, for edge A 
b	b	b		**1m**	Correct edge, ie 	✗ *Ambiguous indication that could refer to more than one edge* eg, for edge A  ! *Both edges identified correctly but no indication of which is which* Mark as 0, 1
c	c	c		**1m**	Both correct, ie 	! *Different symbols* Accept if unambiguous, but do not accept use of letters A and/or B

Tier & Question						
3-5	4-6	5-7	6-8		**Race**	
13	**8**	**3**			**Correct response**	**Additional guidance**
				2m	**3** and **1200** and **Maria** and **6**	✓ *Times within ± 0.1 minutes*
				or **1m**	Any two or three of these correct	✓ *Distance within ± 25 metres*
				1m	**1.5**, or equivalent	! *Ignore name (already assessed)*

Tier & Question						
3-5	4-6	5-7	6-8		**Percentages A**	
14	**9**	**4**			**Correct response**	**Additional guidance**
				1m	**4.50**	
				1m	**45(.00)**	
				1m	**35**	
				1m	**5(.00)**	

Tier & Question						
3-5	4-6	5-7	6-8		**Museum**	
15	**10**	**5**			**Correct response**	**Additional guidance**
a	a	a		**2m**	**288**	
				or		
				1m	Digits 288 seen or Complete correct method, with not more than one computational error eg ■ 240 × 120 = *1*4000 + 4800 = 18800 Answer 188.00 ■ 240 × £1 = £240, and 240 × 20p = £240 ÷ 5 = 46 so the answer is 286	✖ *Conceptual error* eg ◆ 240 × 12 = 240 + 480 = 720 ◆ 240 × 20 = 240 + 480 = 720
b	b	b		**2m**	**500**	
				or		
				1m	Gives an answer of 5 followed only by one or more zeros eg ■ 5000 ■ 50	

Tier & Question						**Simplify**
3-5	4-6	5-7	6-8			
16	**11**	**6**	**1**		**Correct response**	**Additional guidance**
				1m	$7 + 5t$	✖ *Expression not simplified*
				1m	$3b + 17$	
				1m	$4d + 3$	
				1m	$4m$	

Tier & Question						**Puzzle**
3-5	4-6	5-7	6-8			
	12	**7**	**2**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	(+) 5 and − 3	✓ *Either order* ! *Answers to parts (a) and (b) reversed* Mark as 0, 1
	b	b	b	**1m**	− 5 and (+) 3	
	c	c	c	**1m**	− 4 and − 2	
	d	d	d	**1m**	− 5	

Tier & Question					Coloured Cubes	
3-5	4-6	5-7	6-8			
	13	8	3		Correct response	Additional guidance
	a	a	a	1m	$\frac{4}{5}$, or equivalent probability	
	b	b	b	1m	4	! *Correct digit expressed as a proportion of the total cubes* Mark only the first such occurrence as incorrect eg, mark the following as 0, 1 then 1, 1 • $\frac{4}{5}$ (part b) $\frac{8}{10}$ (part c) $\frac{7}{20}$ (part d) If this is seen for the first time in part (d), mark part (d) as 1, 0
	c	c	c	1m	8	✓ *Answer to part (c) refers to part (b)* eg • 4 more.
	d	d	d	2m *or* 1m	7 Shows $\frac{3}{5}$ of 20 is 12 eg ▪ 12 (green) ▪ $\frac{3}{5} = \frac{12}{20}$ or 13 seen with no evidence of an incorrect method.	× *12B or 12Y*

Tier & Question					Perimeters	
3-5	4-6	5-7	6-8			
	14	9	4		Correct response	Additional guidance
	a	a	a	**1m**	**Both correct,** ie ☐ ☐ ☑ ☐	
	b	b	b	**2m**	Correct **simplified expression** eg ▪ $4n + 10$ ▪ $4(n + 2.5)$ ▪ $2(2n + 5)$ ▪ $(2n + 5) \times 2$ ***or*** **1m** Correct expression seen, even if terms are not collected together eg ▪ $5 + n + n + n + n + 5$ ▪ $2n + 2n + 10$ or An otherwise correct simplified expression, of $4n + k$, $(k \neq 10)$ eg ▪ $4n + (10 \div 2)$ ▪ $4(n + 5)$ ▪ $2(2n + 2)$	**!** ***Incorrect working follows correct response*** eg, for part (a) ◆ $4n + 10 = 40n$ Mark as 1, 0 **!** ***Correct answer preceded by incorrect working*** If the intended answer is unambiguous, ignore preceding work eg, for part (a), accept ◆ $5 + 2n \times 2 = 10 + 4n$ **!** ***An otherwise correct simplified expression with the only error being that the brackets are omitted*** eg, for part (b) ◆ $2n + 5 \times 2$ Mark as 1, 0
	c	c	c	**2m**	Correct **simplified expression** eg ▪ $40 + n$ ▪ $2(20 + \frac{1}{2}n)$ ***or*** **1m** Correct expression seen, even if terms are not collected together eg ▪ $10 \times 4 + n$ ▪ $40 + \frac{1}{2}n + \frac{1}{2}n$ ▪ $2(n \div 2 + 20)$ or An otherwise correct simplified expression, of $n + k$, $(k \neq 40$ but is a multiple of $10)$ eg ▪ $2(n \div 2 + 10)$	**!** ***Value for n substituted into an otherwise creditworthy response*** Ignore.
	d	d	d	**1m**	**10**	✓ ***10 cm***

Tier & Question						
3-5	4-6	5-7	6-8		**Equations**	
	15	**10**	**5**		**Correct response**	**Additional guidance**
		a	a	**2m**	All correct, ie **E** **A** **C** **D** **B**	
				or		
				1m	At least 3 correct	
		b	b	**1m**	**No** with correct explanation The most common correct explanations are: Substituting $x = 10$, or $y = 10$, or both, into the equation eg ■ $10 \neq 2 \times 10 - 5$ ■ The line would go through (7.5, 10) ■ The line would go through (10, 15) ■ When $x = 10$, $y = 15$ or Comparing $y = 2x - 5$ to $y = \frac{3}{2}x - 5$, identifying the common y-intercept and different gradient eg ■ It goes through -5 on the y-axis, but it's steeper than $y = \frac{3}{2}x - 5$, so it can't go through (10, 10) ■ No. The intercept is the same as line D but it's a different slope. or Interpreting the gradient and y-intercept eg ■ It goes through -5 on the y-axis, and the gradient of 2 takes it up 2 for every 1 along, so no. or Showing a minimum of 2 correct points on the line $y = 2x - 5$, and a convincing reason eg ■ Correct line drawn, crossing $y = 10$ ■ Two correct points shown that are either side of the line $y = 10$ ■ The line goes through (6, 7) and (7, 9) and if you continue it, it will miss (10, 10)	✓ *Minimally acceptable explanation* eg ◆ It would go through about (8, 10) ◆ $2 \times 10 - 5 = 15$ ✓ *Minimally acceptable explanation* eg ◆ Line D goes through (10, 10) so $y = 2x - 5$ can't. ✓ *Informal description of the y-intercept* eg ◆ It cuts at -5 but different gradient to D ◆ Starts at -5 then different slope to D ◆ Goes through -5, gradient not like D ! *Incorrect co-ordinates alongside correct ones* Ignore if the correct line is drawn on the graph, or the correct points are otherwise identified. If no identification is possible, accept one or more incorrect provided there are at least 3 correct and there is a convincing reason.
			c	**1m**	$\frac{1}{10}$	✓ *Equivalent fractions and decimals* × $\frac{1}{10}x$

Tier & Question						
3-5	4-6	5-7	6-8		**Rounding**	
		11	**6**		**Correct response**	**Additional guidance**
		a	a	**1m**	_ _ (8) _ _ _	
		b	b	**1m**	_ _ _ (16) _ _	
		c	c	**1m**	**6**	✗ *6.0*
		d	d	**1m**	Answer in the range **28 to 34** inclusive	

Tier & Question						
3-5	4-6	5-7	6-8		*Marking overlay available* **Mast**	
		12	**7**		**Correct response**	**Additional guidance**
				1m	**Perpendicular bisector** between A and C, at least 2cm in length. Their line, when extended, must all be within the tolerance of the region shown on the overlay.	✓ *For all marks, accept freehand within the tolerance defined* ✓ *Line and/or curve represented, unambiguously, by a series of points*
				1m	**Arc,** of at least the length defined on the overlay, within the tolerance shown.	! *Arc inaccurate beyond the region defined on the overlay* Ignore the arc drawn outside the region on the overlay.
				1m	**Complete correct region** following through from their attempt at an arc from B with either an attempted perpendicular bisector or an arc from A	✗ *Region incomplete* eg • Not enclosed at one end. • Point(s) rather than region identified.

Tier & Question						
3-5	4-6	5-7	6-8		**Factorising**	
		13	**8**		**Correct response**	**Additional guidance**
		a	a	**1m**	Correct two expressions eg ▪ ✓ — — — ✓	✓ *Any indication*
		b	b	**1m**	Correct expression eg ▪ — — — × —	
		c	c	**1m**	$7(y + 2)$	✓ *y expressed as 1y*
		d	d	**2m**	$2y^2(3y - 1)$	✓ *For 2m,* $6y^2(y - \frac{1}{3})$ *or* $-2y^2(1 - 3y)$
				or **1m**	Any of the following partial simplifications ▪ $2(3y^3 - y^2)$ ▪ $2y(3y^2 - y)$ ▪ $y(6y^2 - 2y)$ ▪ $y^2(6y - 2)$	✓ *For 1m, the equivalent partial simplification with the term outside the bracket negative* ✓ *For 1m, the only error is in the sign or in the last bracket omitted* eg ◆ $2y^2(3y + 1)$

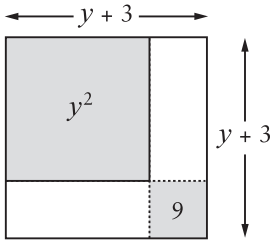
Tier & Question						
3-5	4-6	5-7	6-8		**Operations**	
		14	**9**		**Correct response**	**Additional guidance**
		a	a	**2m**	**0.05** and **0.1** chosen, and answer **0.005**	✓ *For 2m or 1m, 0.05 chosen twice (answer 0.0025)*
				or **1m**	Both cards correct but answer incorrect or omitted or The correct answer to any two decimal values eg ▪ $0.1 \times 0.2 = 0.02$	
		b	b	**1m**	**10 ÷ 0.1**	

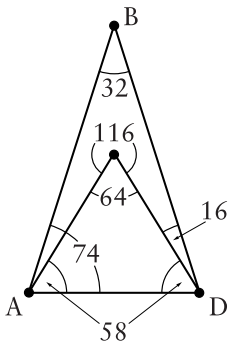
Tier & Question						Expressions
3-5	4-6	5-7	6-8			
		15	**10**		**Correct response**	**Additional guidance**
		a	a	**1m**	**$3x + 10$**	
		b	b	**1m**	Any three expressions that add to **$12x$** eg ■ $4x - 5$, $4x$, $4x + 5$ ■ $4x$, $4x$, $4x$ ■ $2x + 4$, $x - 3$, $9x - 1$	✓ *One or two numerical values given* eg ◆ $12x$, 7, -7 ✓ *Expressions that are not simplified* eg ◆ $4 \times x$, $6x - 2x$, $2x + 2x$
		c	c	**2m** *or* **1m**	**$4x + 2$** or **$2(2x + 1)$** Correct total of the expressions seen or inferred, even if followed by incorrect working eg ■ $12x + 6$ ■ $2x + 5x + 5x = 12x$, $3 + - 9 + 12 = 6$ or Complete correct method with not more than one computational error eg ■ $2x + 5x + 5x = 12x$, $3 - 9 + 12 = 3$ so mean is $4x + 1$	

Tier & Question						Values
3-5	4-6	5-7	6-8			
		16	**11**		**Correct response**	**Additional guidance**
		a	a	**1m**	**$2n$**	✓ *Correct responses that are then evaluated*
		b	b	**1m**	**$\frac{2}{n}$**	✗ *Evaluation without indication of correct response* eg, for part (c) ◆ $(-2)^2$
		c	c	**1m**	**n^2**	

Tier & Question					Similar Triangles	
3-5	4-6	5-7	6-8			
			12		**Correct response**	**Additional guidance**
			a	**2m** *or* **1m**	**15** Correct ratio identified eg ■ $\frac{P}{12} = \frac{10}{8}$ ■ $\frac{10}{P} = \frac{8}{12}$ or Correct scale factor seen eg ■ 1.5 ■ × 12 ÷ 8	
			b	**1m**	**12**	
			c	**1m**	**Yes** with **correct justification** eg ■ Angles same, so yes.	✓ *Minimally acceptable justification* eg ◆ Yes, with 40 and 80 shown correctly on diagram. ✗ *Correct angles found but no decision taken regarding similarity* Note that finding the missing angles is a lower level skill. What is being assessed here is applying that knowledge within the context of similarity, hence a decision must be taken. ✗ *Correct angles found but explanation is incomplete or incorrect* eg ◆ Missing angles are 40 and 80, and 40 is half of 80, so yes.

Tier & Question						Powers
3-5	4-6	5-7	6-8			
			13		Correct response	Additional guidance
			a	1m	Correct explanation showing both aspects below: Shows all three component parts as 7^2 or 7×7 7^3 or $7 \times 7 \times 7$ 7^5 or $7 \times 7 \times 7 \times 7 \times 7$ **and** Shows how the component parts are linked, either through multiplication or through addition of the powers (must be stronger than a restatement of the given $49 \times 343 = 16807$) eg ■ $49 \times 343 = 7^2 \times 7^3 = 7^5$ ■ $7^2 \times 7^3 = 7^5$ ■ $7^5 = (7 \times 7) \times (7 \times 7 \times 7)$ ■ $49 = 7 \times 7$; $343 = 7 \times 7 \times 7$ $(7 \times 7) \times (7 \times 7 \times 7) = 16\,807$ ■ It's $7^2 \times 7^3$, add the powers you get 7^5 **or** Correct explanation showing the powers add to 5 eg ■ The powers are 2 and 3, and 2 + 3 = 5 ■ $7^2 = 49$, $7^3 = 343$, 2 + 3 = 5	✗ *Component parts not all shown* eg ◆ $49 \times 343 = 7^2 \times 7^3$ ◆ $7^5 = 7 \times 7 \times 7 \times 7 \times 7$ ✗ *No indication that the component parts need to be multiplied or the powers need to be added* eg ◆ $49 = 7^2$, $343 = 7^3$, $16807 = 7^5$ ◆ 7^2 and $7^3 = 7^5$ ◆ $49 = 7 \times 7$; $343 = 7 \times 7 \times 7$ $7 \times 7 \times 7 \times 7 \times 7 = 16\,807$ ✗ *Shows $7^2 + 7^3 = 7^5$ alongside a correct response* eg ◆ $49 = 7^2$, $343 = 7^3$, $7^2 + 7^3 = 7^5$, powers add to 5 ! *Unconventional notation showing powers are added* Accept only if clearly intended to refer to powers eg ◆ $7^2 + 7^3 = 7^5$
			b	1m	7	✗ *Incomplete processing* eg ◆ $7^8 \div 7^7$ (part b) ◆ $7^6 \div 7^4$ (part c)
			c	1m	49 or 7^2	✗ *Incorrect processing* eg ◆ $7^2 = 14$ (part c)
			d	1m	1	! *Other digits preceding 1* Ignore.

Tier & Question						
3-5	4-6	5-7	6-8		**Expansion**	
			14		**Correct response**	**Additional guidance**
			a	**1m**	**Correct explanation** eg ■ Any correctly evaluated counter-example. ■ It's $y^2 + 3y + 3y + 9$ ■ There has to be a y-term in it. ■ 	✗ *Counter-example not evaluated* eg ◆ If $y = 5$, you can see they are not equal. ◆ $y = 10$, $(10 + 3)^2 \neq 10^2 + 9$ ✗ *Incorrect expansion* The expression need not be expanded, but if it is then all terms must be correct. ✗ *Incomplete explanation* eg ◆ Because it's squaring the whole answer. ◆ It's $(y + 3)(y + 3)$ not $(y \times y) + 9$ ◆ It's not $y^2 + 3^2$, it's $(y + 3)^2$
			b	**1m**	Correct simplified expansion eg ■ $y^2 + 7y + 10$	
				2m	**$y^2 - 12y + 36$**	
				or		
				1m	Correct expansion, but not simplified, or simplified incorrectly eg ■ $y^2 - 6y - 6y + 36$ seen	
				2m	**$6y^2 - y - 40$**	
				or		
				1m	Correct expansion, but not simplified, or simplified incorrectly eg ■ $6y^2 - 16y + 15y - 40$ seen	✓ ***For 1m, condone positive sign for 15y omitted*** eg ◆ $6y^2 - 16y$ $15y - 40$ seen

Tier & Question						Isosceles
3-5	4-6	5-7	6-8			
			15		Correct response	Additional guidance
			a	1m	**Correct justification** The most common correct justifications are: Working with triangle ACB eg ■ The other angles in triangle ACB are 16° and 148°, and 180 − 16 − 148 = 16 or Working with triangles ABD and ACD eg ■ ∠BAD = $\frac{180-32}{2}$ = 74, ∠CAD = $\frac{180-64}{2}$ = 58; 74 − 58 = 16 ■ ∠CAD = 58, if a = 16 then 58 + 16 + 32 + 16 + 58 = 180, so true. ■ In triangle ACD there's another 116°, in triangle ABD there's another 148°, 148 − 116 = 32, 32 ÷ 2 = 16 or Working with quadrilateral ACDB eg ■ 180 + 116 + 32 + 2a = 360, 2a = 360 − 328, 2a = 32	✓ *Calculations shown on the diagram* The following may be helpful:  ✗ *Subtraction shown in incorrect order* eg ◆ 64 − 180 = 116 ✗ *Computational error* eg ◆ 180 − 64 = 68, 74 − 68 = 16 ✗ *Incomplete response* eg ◆ 74 and 58 calculated, but no indication that 74 − 58 is needed. ✗ *Spurious working* eg ◆ 32 ÷ 16 (unsupported) ◆ Small triangle 64, 58, 58; big triangle 32, 74, 74 and 90 − 74 = 16

Tier & Question						
3-5	4-6	5-7	6-8		**Isosceles (cont)**	
			15		**Correct response**	**Additional guidance**
			b	**2m**	**Correct proof** The most common correct proofs are: Working with triangle ACB eg ▪ $180 - (180 - x + \frac{1}{2}x) = \frac{1}{2}x$ or Working with triangles ABD and ACD eg ▪ $\angle BAD - \angle CAD =$ $\frac{1}{2}(180 - x) - \frac{1}{2}(180 - 2x)$ $= 90 - \frac{1}{2}x - 90 + x$ $= \frac{1}{2}x$ or Working with quadrilateral ACDB eg ▪ Other angle at C is $360 - 2x$, so $2a + x + 360 - 2x = 360$ $2a - x = 0$ $2a = x$ $a = x \div 2$	× *Value substituted for x without supporting algebraic proof* × *For 2m, incomplete working* eg ◆ $\frac{1}{2}(180 - x) - \frac{1}{2}(180 - 2x) = \frac{1}{2}x$
				or **1m**	$\frac{1}{2}(180 - 2x)$ seen or $\frac{1}{2}(180 - x)$ seen or Showing reflex angle at C is $360 - 2x$	