Ma

KEY STAGE
2

LEVELS
3–5

2015

Mathematics tests

Mathematics mark schemes

Paper 1, Paper 2 and mental mathematics

National curriculum tests

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Introduction

The Standards and Testing Agency (STA) is responsible for the development and delivery of statutory tests and assessments. STA is an executive agency of the Department for Education.

This booklet contains the mark schemes for the assessment of levels 3–5 mathematics. Level threshold tables will be available at www.gov.uk/sta from Tuesday 7 July, 2015.

The levels 3–5 mathematics test is made up of 3 papers. A total of 100 marks is available.

- **Paper 1** and **Paper 2** (40 marks each)
- **Mental mathematics paper** (20 marks)

Calculators cannot be used by any pupils sitting the levels 3–5 mathematics test.

As in previous years, external markers will mark the key stage 2 national curriculum tests. The mark schemes are made available to teachers after the tests have been taken.

The mark schemes were written and developed alongside the questions. Pupils' responses from trialling have been added as examples to the mark schemes to ensure they reflect how pupils respond to the questions. The mark schemes indicate the criteria on which judgements should be made. In applying these principles, markers use professional judgement based on the training they have received.

The mathematics test mark schemes

The marking information for each question is set out in the form of tables, which start on page 8 of this booklet.

The '**Question**' column on the left-hand side of each table provides a quick reference to the question number and the question part.

The '**Requirement**' column may include 2 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
- examples of some different types of correct response.

The '**Mark**' column indicates the total number of marks available for each question part. On some occasions the symbol (U1) may be shown in the 'Mark' column. The 'U' indicates that there is a Using and applying mathematics element in the question. The number, 1, shows the number of marks attributed to Using and applying mathematics in this question.

The '**Additional guidance**' column indicates alternative acceptable responses, and provides details of specific types of response which are unacceptable. Other guidance, such as the range of acceptable answers, is provided as necessary.
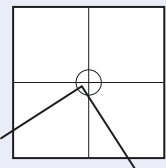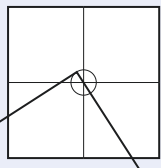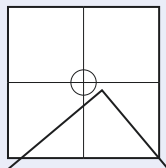
Additionally, for the mental mathematics test, general guidance on marking is given on page 20, followed by the marking information for each question.

Applying the mark schemes

To ensure consistency of marking, the most frequent queries about applying the mark schemes are listed on pages 4 and 5 along with the action the marker will take. This is followed by further guidance on pages 6 and 7 relating to the marking of questions that involve money, time and other measures. Unless otherwise specified in the mark schemes, markers will apply the following guidelines in all cases.

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General guidance in marking the levels 3–5 mathematics tests

What if…	Marking procedure	
The pupil's response is numerically or algebraically equivalent to the answer in the mark scheme.	Markers will award the mark unless the mark scheme states otherwise.	
The pupil's response does not match closely any of the examples given.	Markers will use their judgement in deciding whether the response corresponds with the statement of the requirements given in the 'Requirement' column. Reference will also be made to the 'Additional guidance' column and, if there is still uncertainty, markers will 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, will be accepted.	
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, 1 mark only will be deducted. In 1-mark questions – 0 marks are awarded. In 2-mark questions that have a method mark – 1 mark will be awarded if the correct method is correctly implemented with the misread number.	
No answer is given in the expected place, but the correct answer is given elsewhere.	Where a pupil has shown understanding of the question, the mark(s) will 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.	
The pupil's answer is correct but the wrong working is shown.	A correct response will always be marked as correct.	
The response in the answer box is wrong, but the correct answer is shown in the working.	Where appropriate, detailed guidance will be given in the mark scheme, which markers will follow. If no guidance is given, markers will examine each case to decide whether:	
	■ the incorrect answer is due to a transcription error	If so, the mark **will** be awarded.
	■ the pupil has continued to give redundant extra working which does not contradict work already done	If so, the mark **will** be awarded.
	■ the pupil has continued to give redundant extra working which does contradict work already done.	If so, the mark **will not** be awarded.

What if…	Marking procedure
The correct response has been crossed out and not replaced.	Any legible crossed-out work that has not been replaced will be marked according to the mark schemes. If the work is replaced, then crossed-out work will not be considered.
More than 1 answer is given.	If all answers are correct (or a range of answers is given, all of which are correct), the mark will be awarded unless prohibited by the mark schemes. If both correct and incorrect responses are given, no mark will be awarded.
The answer is correct but, in a later part of the question, the pupil has contradicted this response.	A mark given for 1 part will not be disallowed for working or answers given in a different part, unless the mark scheme specifically states otherwise.
The pupil has drawn lines which do not meet at the correct point.	Markers will interpret the phrase 'slight inaccuracies in drawing' to mean 'within or on a circle of radius 2mm with its centre at the correct point'. within the circle accepted on the circle accepted outside the circle **not** accepted

Recording marks awarded

Marking will take place on screen with markers viewing scanned images of pupils' scripts. Marks should be entered into the marking system in accordance with the guidance for the on-screen marking software.

Further details on recording marks and the use of the on-screen system will be given at marker training.

For multiple-mark questions, markers will record the award 2, 1 or 0 as appropriate, according to the mark-scheme criteria. There will be provision in the software to record questions not attempted.

The software will aggregate mark totals automatically.

Marking specific types of question: summary of additional guidance

Responses involving money

	Accept	Do not accept
Where the £ sign is given for example: £3.20, £7 £ ☐	£3.20 £7 £7.00 Any unambiguous indication of the correct amount, eg: £3.20p £3 20 pence £3 20 £3,20 £3-20 £3:20	Incorrect placement of pounds or pence, eg: £320 £320p Incorrect placement of decimal point, or incorrect use or omission of 0, eg: £3.2 £3 200 £32 0 £3-2-0
Where the p sign is given for example: 40p ☐ p	40p Any unambiguous indication of the correct amount, eg £0.40p	Incorrect or ambiguous use of pounds or pence, eg: 0.40p £40p
Where no sign is given for example: £3.20, 40p ☐	£3.20 40p 320p £0.40 Any unambiguous indication of the correct amount, eg: £3.20p £0.40p £3 20 pence £.40p £3 20 £.40 £3,20 40 £3-20 0.40 £3:20 3.20 320 3 pounds 20	Incorrect or ambiguous use of pounds or pence, eg: £320 £40 £320p £40p £3.2 0.4 3.20p 0.40p

Responses involving time

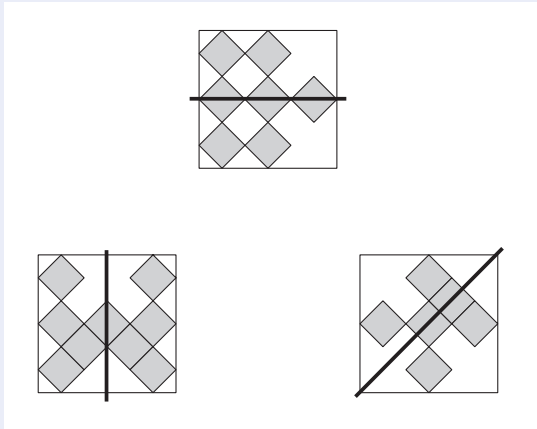| A time interval	Accept	Do not accept
for example: 2 hours 30 minutes	2 hours 30 minutes Any unambiguous, correct indication, eg: $2\frac{1}{2}$ hours 2.5 hours 2h 30 2h 30 min 2 30 150 minutes 150 Digital electronic time, ie 2:30	Incorrect or ambiguous time interval, eg: 2.30 2-30 2,30 230 2.3 2.3 hours 2.3h 2h 3 2.30 min
A specific time for example: 8:40am, 17:20	8:40am 8:40 twenty to nine Any unambiguous, correct indication, eg: 08.40 8.40 0840 8 40 8-40 8,40 Unambiguous change to 12- or 24-hour clock, eg: 17:20 as 5:20pm or 17:20pm	Incorrect time, eg: 8.4am 8.40pm Incorrect placement of separators, spaces, etc or incorrect use or omission of 0, eg: 840 8:4:0 8.4 084

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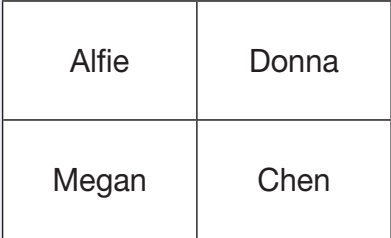
Where units are given (eg: kg, m, l)	Accept	Do not accept
for example: 8.6kg ⬚ **kg**	8.6kg Any unambiguous indication of the correct measurement, eg: 8.60kg 8.6000kg 8kg 600g	Incorrect or ambiguous use of units, eg 8600kg

Note

If a pupil leaves the answer box empty but writes the answer elsewhere on the page, then that answer must be consistent with the units given in the answer box and the conditions listed above.
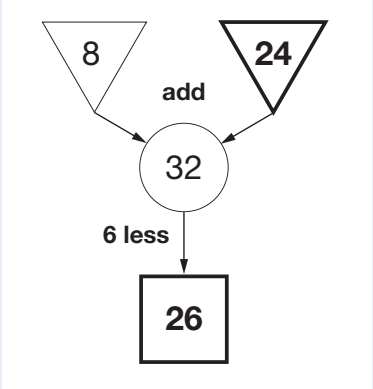
If a pupil changes the unit given in the answer box, then their answer must be equivalent to the correct answer using the unit they have chosen, unless otherwise indicated in the mark schemes.
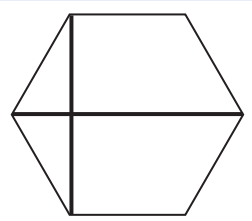
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Paper 1

Question	Requirement	Mark	Additional guidance
1	Award **TWO** marks for four names correctly placed on the diagram as shown: 	Alfie	Donna
Megan	Chen | If the answer is incorrect, award **ONE** mark for three names correctly placed.	Up to 2m	Accept unambiguous abbreviations or recognisable misspellings. **Do not** accept names written in more than one section.
2	Number circled as shown: 525 **491** 511 408 550	1m	Accept alternative unambiguous indications, eg number ticked, crossed or underlined.
3	3404	1m	
4	Award **TWO** marks for three lines of symmetry drawn corrrectly as shown: If the answer is incorrect, award **ONE** mark for two lines of symmetry correctly drawn.	Up to 2m	Accept inaccurate drawing provided the intention is clear.
5a	35	1m	The answer is a time interval (see page 7 for guidance).
5b	4:15	1m	The answer is a specific time (see page 7 for guidance).

Paper 1

Question	Requirement	Mark	Additional guidance
6a	Diagrams completed correctly as shown:	1m	
6b		1m	
7	Award **TWO** marks for the correct answer of 290 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg: ■ 110 140 170 200 230 260 290 (320) OR ■ 110 140 170 190 220 250 280 (310) OR ■ 300 + 20 = 320 320 – 30 = wrong answer	Up to 2m (U1)	Working must be carried through to reach an answer for the award of **ONE** mark. Not spotting closest number One step size incorrect (170 to 190)
8a	63	1m	
8b	5	1m	

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Paper 1

Question	Requirement	Mark	Additional guidance
9a	£7	**1m**	Accept an answer in the range £6.75 to £7.25 inclusive.
9b	4	**1m**	**Do not** accept a list of classes.
10a	Award **TWO** marks for the correct answer of £7.05 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg: ■ £20 – £5.45 – £7.50 = wrong answer **OR** ■ £5.45 + £7.50 = £12.95 £20 – £12.95 = wrong answer	**Up to 2m**	Accept for **ONE** mark £705 **OR** £705p as evidence of appropriate working. Working must be carried through to reach an answer for the award of **ONE** mark.
10b	15	**1m**	
11a	**X** = 125	**1m**	
11b	**Y** = −75	**1m**	**Do not** accept 75−
12a	Answer in the range 65mm to 69mm **inclusive**.	**1m**	
12b	Answer in the range 123º to 127º **inclusive**.	**1m**	
13	Diagram completed as shown: **OR** 	**1m** (U1)	Accept slight inaccuracies in drawing, provided the intention is clear. Diagrams may be completed in any orientation.
14	83.6	**1m**	

Paper 1

Paper 1

Question	Requirement	Mark	Additional guidance
15		6	1	–	2	7	= 34	1m (U1)	
16	50p 20p 10p 10p 10p	1m (U1)	Coins may be given in any order.
17a	1974 **OR** 1975 **OR** 1976	1m	
17b	A whole number answer in the range 130 000 to 180 000 **inclusive**.	1m	
17c	A whole number answer in the range 510 000 to 550 000 **exclusive**.	1m	**Do not** accept 510 000 **OR** 550 000
18	352	1m	**Do not** accept 352%

19	Award **TWO** marks for the correct answer of 75
	
	If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg:
	
	■ 125 ÷ 50 = 2.5
	
	   2.5 × 30 = wrong answer
	
	OR
	
	■ 50 g oats 30 g raisins
	
	   25 g oats 15 g raisins (÷ 2)
	
	   125 g oats wrong answer (× 5)
		Up to 2m	Working must be carried through to reach an answer for the award of **ONE** mark.

20a	56	1m	
20b	34	1m	If the answers to a and b are incorrect, award **ONE** mark if their a plus their b = 90°, provided that b is **not** 45°, 30° or 60°.

Paper 1

Paper 1

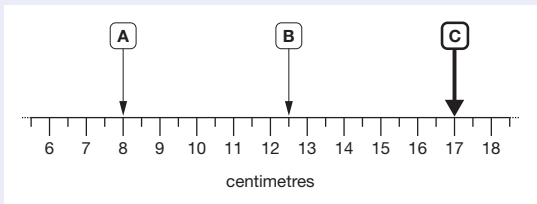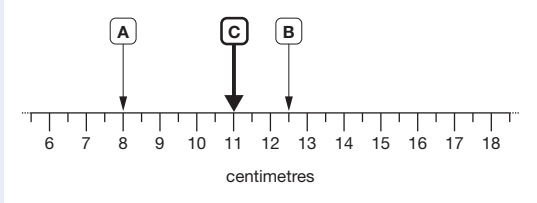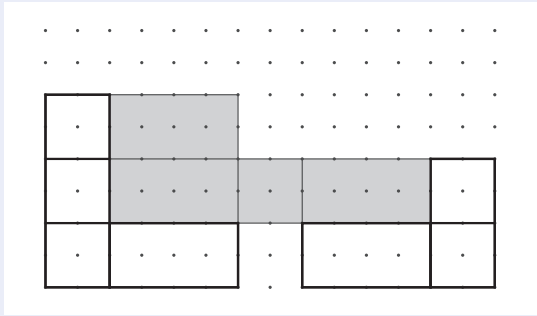| Question	Requirement	Mark	Additional guidance
21	Two numbers with a difference of 2, in the range 48 **inclusive** to 52 **exclusive** eg: ■ 48 **AND** 50 **OR** ■ 51.9 **AND** 49.9 **OR** any pair of numbers that differ from those above by a multiple of 100 and have a difference of 2, eg: ■ 149 **AND** 151 **OR** ■ 648 **AND** 650	**1m** (U1)	Numbers can be given in either order.
22	38	**1m**	
23	A counter-example or an explanation that shows Alfie is incorrect, eg: ■ 'It doesn't work when one of the numbers is 1' ■ '1 × 99 = 99, and 99 is not less than 99' ■ 'It's not true for zero' ■ '0 × 5 = 0, and 0 is less than 5' ■ 'It doesn't work for fractions less than 1' ■ '0.5 × 8 = 4, and 4 is less than 8' ■ 'If one number is negative and the other is positive, the answer is negative'	**1m** (U1)	No mark is awarded for circling '**No**' alone. **Do not** accept vague or incomplete explanations, eg: ■ 'It's not always true' ■ 'It doesn't work when one of the numbers is small' If 'Yes' is circled but a correct, unambiguous explanation is given then award the mark.
24	Award **TWO** marks for the correct answer of 55p **OR** £0.55 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg ■ £2.35 – £1.25 = £1.10 £1.10 ÷ 2 = wrong answer	**Up to 2m** (U1)	Accept for **ONE** mark £55 **OR** £55p **OR** 0.55p as evidence of appropriate working. Working must be carried through to reach an answer for the award of **ONE** mark.

Paper 1

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Paper 2

Question	Requirement	Mark	Additional guidance
1	89	**1m**	
2	Temperatures in ascending order, as shown: –24ºC –13ºC 0ºC 21ºC 35ºC	**1m**	
3a	£3.48	**1m**	

3b	Award **TWO** marks for the correct answer of £1.10
	
	If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg:
	
	■ £1.80 + 30p = £2.10
	
	  60p + 40p = £1.00
	
	  £2.10 – £1.00 = wrong answer
		Up to 2m	Accept for **ONE** mark £110 **OR** £110p as evidence of appropriate working.
			
			Working must be carried through to reach an answer for the award of **ONE** mark.

4	Award **TWO** marks for three numbers correct as shown: 19 38 **76** 152 **304** If the answer is incorrect, award **ONE** mark for two numbers correct.	**Up to 2m**	
5	2 **AND** 4	**1m**	Accept alternative unambiguous indications, eg right angles marked on diagrams.
6a	5	**1m**	
6b	45	**1m**	
7	Award **TWO** marks for the correct answer of A **AND** E If the answer is incorrect, award **ONE** mark for: ■ both letters correct and not more than one incorrect ■ A only (and no other letters) ■ E only (and no other letters)	**Up to 2m**	Letters may be given in either order. Accept alternative unambiguous indications, eg tiles ticked or circled.

Paper 2

Question	Requirement	Mark	Additional guidance
8a	$4\frac{1}{2}$ **OR** 4.5	**1m**	
8b	A point marked on the line at either 17cm **OR** 11cm, ie **OR**	**1m** Ⓤ1	The mark need not touch the line provided the intention is clear. The marked point need not be labelled.
9a	Rectangle (oblong) drawn in one of the correct positions as shown in diagram below:	**1m**	
9b	Square drawn in one of the correct positions as shown in diagram below: 	**1m**	Only accept a square that is joined to the side of an adjacent rectangle (oblong).
10a	Any two triangles in the shape shaded.	**1m**	Accept alternative unambiguous indications.
10b	Any two more triangles in the shape shaded.	**1m**	Accept alternative unambiguous indications.
11a	14	**1m**	
11b	$\frac{1}{3}$	**1m**	Accept equivalent fractions eg $\frac{7}{21}$ Ignore subsequent work if $\frac{7}{21}$ is simplified incorrectly. Accept follow through in part b of $\frac{7}{a+7}$

Paper 2

Question	Requirement	Mark	Additional guidance

12	Award **TWO** marks for the correct answer of 60
	
	If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg:
	
	■ Ate 10, gave away 5
	  Ate 40, gave away 20
	  Ate 40 + 20 = wrong answer
	
	■ 40 ÷ 10 = 4
	  4 × 5 = 20
	  20 + 40 = wrong answer
		Up to 2m
		
		U1
			Working must be carried through to reach an answer for the award of **ONE** mark.

13	Award **TWO** marks for the correct answer as shown: 51 52 50 48 49 If the answer is incorrect, award **ONE** mark for 4 true statements with no number repeated (within those 4), eg: 48 **OR** ☐ (blank) 52 52 50 50 51 48 49 49	**Up to 2m** U1	**Do not** accept numbers other than those given. (Multiple of 3 can be 48 **OR** 51) (Multiple of 4 can be 48 **OR** 52)
14	13	1m	
15	350	1m	

Paper 2

Question	Requirement	Mark	Additional guidance
16a	7	**1m**	
16b	8	**1m**	
17a	38	**1m**	The answer is a time interval (see page 7 for guidance).
17b	10:21	**1m**	The answer is a specific time (see page 7 for guidance).
17c	10:58	**1m**	
18	Number circled as shown: (19.95) 20.1 19.09 20.09 20.201	**1m**	Accept alternative unambiguous indications, eg number ticked, crossed or underlined.
19	Award **TWO** marks for the correct answer of 26 If the answer is incorrect award **ONE** mark for evidence of appropriate working which contains not more than **ONE** arithmetical error, eg: ■ Long divisional algorithm $\qquad$ wrong answer 36 $\vert$ 936 $\qquad$ −720 $\qquad$ 216 $\qquad$ −216 $\qquad$ 0 ■ Short division algorithm $\qquad$ wrong answer 36 $\vert$ 93²¹6 ■ Repeated addition/subtraction methods, eg $\quad$ 936 $\quad$ −360 10 × 36 $\quad$ 576 $\quad$ −360 10 × 36 $\quad$ 216 $\quad$ −216 6 × 36 $\quad$ wrong answer ■ Factorisation methods, eg 936 ÷ 9 = 104 104 ÷ 4 = wrong answer	**Up to 2m**	Working must be carried through to reach an answer for the award of **ONE** mark. In all cases, accept follow-through of **ONE** error in working. Variations on algorithms are acceptable, provided they represent a viable and complete method. **Do not** award any marks if the final answer is missing. Short division methods must be supported by evidence of appropriate carrying figures to indicate use of division algorithm and be a complete method. **No mark** is awarded for addition/subtraction the wrong number of times.

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Paper 2

Question	Requirement	Mark	Additional guidance
20	Award **TWO** marks for the correct answer of 72 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg ■ $13 \times 4 = 52$ $5 \times 4 = 20$ $52 + 20 =$ wrong answer	**Up to 2m**	Working must be carried through to reach an answer for the award of **ONE** mark.
21	Award **TWO** marks for the sequence completed correctly as shown: 1 $2\frac{1}{2}$ 4 $5\frac{1}{2}$ 7 If the answer is incorrect, award **ONE** mark for two numbers correct.	**Up to 2m**	
22	(50, 15)	**1m**	
23	An explanation which recognises that they are equally likely to choose a blue counter, eg: ■ 'Half the counters in each bag are blue' ■ '5 out of 10 is the same as 10 out of 20' ■ 'Chen has twice as many blue counters but he also has twice as many counters altogether, so the chance is the same'.	**1m** U1	No mark is awarded for circling 'No' alone. **Do not** accept vague or incomplete explanations, eg: ■ 'There is an equal chance' ■ 'If Chen has 10 blue and Megan has 5'. If 'Yes' is circled but a correct, unambiguous explanation is given, then award the mark.

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Mark scheme for the mental mathematics test

Applying the mark scheme

Please note that pupils will not be penalised if they record any information given in the question or show their working. External markers will ignore any annotation, even if in the answer space, and mark only the answer. External markers will accept an unambiguous answer written in the stimulus box, or elsewhere on the page.

Full mark scheme information is given on page 22. In addition, a 'quick reference' mark scheme is provided on page 21. This is presented in a similar format to the pupils' answer sheet.

General guidance

The general guidance for marking the written tests also applies to marking the mental mathematics test. In addition, the following principles apply.

1. Unless stated otherwise in the mark scheme, accept answers written in words, or a combination of words and figures.

2. Where units are specified, they are given on the answer sheet. Pupils are not penalised for writing in the units again.

3. Where answers are required to be ringed, do not accept if more than 1 answer is ringed, unless it is clear which is the pupil's intended answer. Accept also any other way of indicating the correct answer, eg underlining.

2015 mental mathematics

Quick reference mark scheme

Practice question

Time: 5 seconds

1	84			1

2	12			2

3	50			3

4	35	mins	11:25	4

5	100	g		5

Time: 10 seconds

6	£3.20	£6.80	6

7	27	18	7

8	900		8

9	0.1 0.3 0.5 (0.7) 0.9		9

10	22		10

11	10			11

12	0.35			12

13	42	40		13

14	1.8			14

15	750 000			15

Time: 15 seconds

16	110	5	16

17	4	cm	30cm	17

18	486	540	18

19	£12.00	£2.40	19

20	8		20

Mental mathematics: Questions 1–20

Question	Requirement	Mark	Additional guidance
1	84	1m	
2	12	1m	
3	50	1m	
4	35	1m	
5	100	1m	
6	£3.20	1m	
7	27	1m	
8	900	1m	
9	0.1 0.3 0.5 (0.7) 0.9	1m	
10	22	1m	
11	10	1m	Accept $\frac{10}{4}$
12	0.35	1m	
13	42	1m	
14	1.8	1m	
15	750 000	1m	
16	110	1m	
17	4cm	1m	
18	486	1m	
19	£12.00	1m	
20	8	1m	

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