

Ma

KEY STAGE
3

LOWER TIER &
HIGHER TIERS

2006

Mathematics tests

Mark schemes for
Mental mathematics
Tests A, B and C

2006



department for
education and skills
creating opportunity, releasing potential, achieving excellence

First published in 2006

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Introduction

This booklet contains the mark schemes for the lower tier test (Test C) and the higher tiers tests (Tests A and B). The pupil answer sheets will be marked by external markers who will follow the mark schemes in this booklet, which are provided here for teachers' reference.

General guidance for markers

Please note that pupils should not be penalised if they record any information given in the question or show their working. Ignore any annotation, even if in the answer space, and mark only the answer. Accept an unambiguous answer written in the stimulus box, or elsewhere on the page, but clearly attributable to the relevant question.

General guidance for marking the written tests also applies to marking the mental mathematics tests. In addition, please apply the following principles unless specific instructions to the contrary are given in the mark scheme:

- accept responses in words and/or figures,
eg 7 point 3, 4 hundred
- accept any unambiguous indication of the correct response from a given list,
eg circling, ticking, underlining
- accept unambiguous misspellings
- accept units that have been correctly converted to a different unit provided the new unit is indicated. Where units have been given on the answer sheet, do not penalise pupils for writing the units again
- accept responses with commas as spacers,
eg 50,000
but do not accept a point used as a spacer,
eg 50.000

Lower tier Test C questions

'Now we are ready to start the test.

For the first group of questions you will have 5 seconds to work out each answer and write it down.'

1	Write in figures the number seven hundred and three.
2	How many right angles does a rectangle have?
3	Multiply eight by three.
4	The height of the Statue of Liberty is one hundred and fifty-one feet. What is this height to the nearest hundred feet?
5	What number do I need to add to thirty-three to make one hundred?
6	How many seconds are there in three minutes?
7	Divide nine hundred and twenty by ten.
8	What number is four less than minus seven?
9	Look at the expression on your answer sheet. Write it as simply as possible.

'For the next group of questions you will have 10 seconds to work out each answer and write it down.'

10	A group of pupils share twenty-four pounds. They each get exactly six pounds. How many pupils are in the group?
11	Look at the diagram on your answer sheet. Put a ring round the arrow that is pointing south-west.
12	Subtract twenty-four from fifty.
13	For two adults to see a film, the cost is eleven pounds altogether. How much does it cost for one adult to see the film?
14	Look at the equation. What is the value of x ?
15	Look at the numbers on your answer sheet. Add them.
16	Look at the data on your answer sheet. Which number is the mode?
17	Look at the diagram drawn on a square grid. What percentage of the diagram is shaded?

'Now turn over your answer sheet.'

Pupil answer sheet

Key stage 3 mathematics 2006 Mental mathematics Test C		Time: 5 seconds continued	
8			-7
9			$3d - d$
First name _____ Last name _____ School _____		Time: 10 seconds	
10	pupils	£24	£6
11			
12		24	50
13	£		£11
14			$16 + x = 23$
15		3.7	0.5
16		5	8
		5	8
		5	6
17			%

Key stage 3 mathematics 2006 Mental mathematics Test C		Total marks	
1		25	
2			
3			
4	feet	151 feet	
5		33	
6	seconds		
7		920	

Practice question	
	25

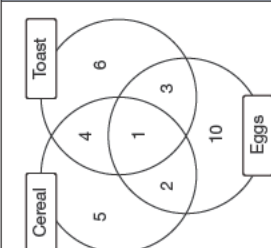
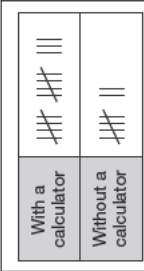
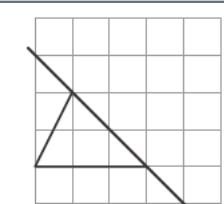
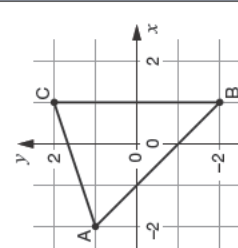

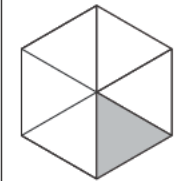
Time: 5 seconds	
1	
2	
3	
4	feet
5	33
6	seconds
7	920

18	The diagram shows what some people had for breakfast. How many people had both cereal and toast, but not eggs?
19	Write a number that is a factor of both nine and twelve.
20	I have a fair six-sided dice numbered one to six. I am going to roll the dice. What is the probability that I will roll an odd number?
21	Look at the triangle drawn on the grid. Write down the coordinates of the point marked A.
22	Two angles fit together to make a straight line. One angle is seventy-eight degrees. How many degrees are there in the other angle?
23	What is the next prime number after seven?

'For the next group of questions you will have 15 seconds to work out each answer and write it down.'

24	The tally chart shows the number of pupils with and without a calculator. Altogether, how many pupils are there?
25	Three pencils cost sixty pence. How much would four pencils cost?
26	Look at the diagram on the square grid. Draw the reflection of the shape in the mirror line.
27	Your answer sheet shows the answer to one hundred and thirty-two divided by six. Use this information to help you work out the answer to one hundred and thirty-two divided by three.
28	Look at the shape made from equilateral triangles. Shade two more triangles so that the shape has rotation symmetry of order three.
29	A birthday card costs one pound and forty-five pence. How much do three of these cards cost?
30	A rectangle has a length of six centimetres and an area of thirty square centimetres. What is the width of the rectangle?

'Put your pens down. The test is finished.'

Time: 10 seconds continued		Time: 15 seconds	
18		24	
19	people	25	pupils
20	9 12	26	
21		27	$132 \div 6 = 22$ $132 \div 3 =$ <input type="text"/>
22		28	
23	7	29	£ <input type="text"/> £1.45
		30	cm <input type="text"/> 6 cm <input type="text"/> 30 cm ²

Key stage 3 mathematics 2006
Mental mathematics lower tier Test C

Test C

Mark scheme

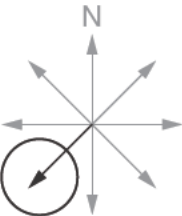
Time: 5 seconds

1	703	Do not accept responses given in words
2	4	
3	24	
4	200 feet	
5	67	Accept embedded values, eg 33 + 67
6	180 seconds	Do not accept amended units
7	92	

Time: 5 seconds continued

8	-11	
9	2d	

Time: 10 seconds

10	4 pupils	Accept embedded values, eg 4 x 6
11		Accept any unambiguous indication
12	26	
13	£ 5.50	
14	7	Accept embedded values, eg 16 + 7
15	4.2	Accept equivalent fractions or decimals
16	5	Accept value indicated in list
17	25 %	Do not accept equivalent fractions or decimals

Time: 10 seconds continued

18	4 people	
-----------	-----------------	--

19	1 or 3	
-----------	----------------------	--

20	$\frac{1}{2}$	Accept equivalent probabilities
-----------	---------------	---------------------------------

21	(-2 , 1)	
-----------	-------------------	--

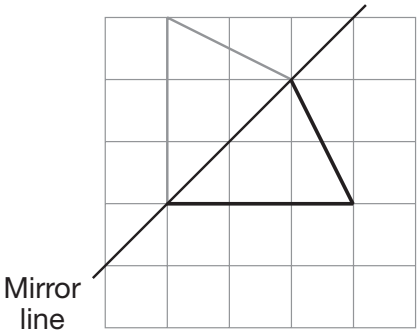
22	102 °	
-----------	--------------	--

23	11	
-----------	-----------	--

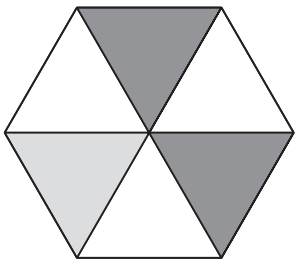
Time: 15 seconds

24	20 pupils	
-----------	------------------	--

25	80 p	
-----------	-------------	--

26	 <p>Mirror line</p>
	Accept lines not drawn accurately, provided the pupil's intention is clear

27	44	
-----------	-----------	--

28	
-----------	---

29	£ 4.35	
-----------	---------------	--

30	5 cm	
-----------	-------------	--

Higher tiers Test A questions

'Now we are ready to start the test.
For the first group of questions you will have 5 seconds to work out each answer and write it down.'

1	What number is the arrow pointing to on the number line?
2	Divide three hundred by ten.
3	Multiply six by nine.
4	How many millimetres are there in eight centimetres?
5	What number is six less than minus two?
6	Write in figures the number that is one less than one million.
7	Round three point six eight to one decimal place.
8	Look at the expression on your answer sheet. Write it as simply as possible.

'For the next group of questions you will have 10 seconds to work out each answer and write it down.'

9	In a quiz, pupils were asked a question. The pictogram shows how many pupils were right and how many were wrong. Eight pupils were right. How many pupils were wrong?
10	The perimeter of a square is twenty centimetres. What is the length of one side of the square?
11	In a class of twenty-eight pupils, thirteen are boys. About what fraction of the class are boys? Put a ring round the fraction that is closest.
12	AB is a straight line. Work out the size of angle w.
13	Look at the expression on your answer sheet. When x is nine, what is the value of the expression?
14	The scale on a map is ten centimetres to two kilometres. On the map the distance between two points is fifteen centimetres. How many kilometres are there between the two points?
15	I have a fair six-sided dice, numbered one to six. I roll the dice. What is the probability that I roll a number greater than two?
16	What is five per cent of three hundred pounds?

'Now turn over your answer sheet.'

Pupil answer sheet

Key stage 3 mathematics 2006
Mental mathematics Test A

First name _____
Last name _____
School _____

Total marks

Time: 5 seconds continued

7		3.68	7
8		$10y^2 - 3y^2$	9

Time: 10 seconds

9	<table border="1" style="margin: auto;"> <tr> <td style="width: 50%; text-align: center;">Right</td> <td style="width: 50%; text-align: center;">Wrong</td> </tr> <tr> <td style="text-align: center;">● ● ● ● ●</td> <td style="text-align: center;">● ● ● ● ●</td> </tr> </table>	Right	Wrong	● ● ● ● ●	● ● ● ● ●		pupils	9
Right	Wrong							
● ● ● ● ●	● ● ● ● ●							

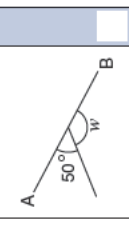
Practice question

10	cm		10
----	----	--	----

Time: 5 seconds

11	13		11												
	<table border="1" style="margin: auto;"> <tr> <td style="width: 20%;">1</td> <td style="width: 20%;">1</td> <td style="width: 20%;">1</td> <td style="width: 20%;">1</td> <td style="width: 20%;">3</td> <td style="width: 20%;">4</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">4</td> </tr> </table>	1	1	1	1	3	4	1	1	1	1	2	4		
1	1	1	1	3	4										
1	1	1	1	2	4										

Time: 5 seconds

12			12
----	--	--	----

13	$2x - 8$		13
----	----------	--	----

14	10cm : 2km	15cm		km	14
----	------------	------	--	----	----

15			15
----	--	--	----

16	£	5%	£300	16
----	---	----	------	----

- 17 Find the volume of a cuboid measuring two centimetres by eight centimetres by four centimetres.
- 18 Material costs four pounds fifty per metre. How many metres of this material can I buy with twenty-seven pounds?
- 19 Using three as an approximation for pi, find the circumference of a circle with diameter eight centimetres.
- 20 Jake and Sarjun share some money in the ratio one to three. Sarjun's share is one hundred and fifty pounds. Altogether, how much money did they share?
- 21 Look at the expression. When y is six, work out the value of the expression.

'For the next group of questions you will have 15 seconds to work out each answer and write it down.'

- 22 Your answer sheet shows the answer to twenty-seven multiplied by thirty-two. Use this information to help you work out the answer to twenty-seven multiplied by sixteen.
- 23 In a survey, some people were asked if they use a library. The pie chart shows the results. Twelve people said no. How many people were asked altogether?
- 24 A machine copies exactly fifty pages a minute. How many pages can it copy in half an hour?
- 25 The diagram shows an arrow of height three centimetres. I enlarge it by a scale factor of two and a half. What is the height of the enlarged arrow?
- 26 The table on your answer sheet shows the number of milk bottles ordered for twenty different houses. Altogether, how many milk bottles were ordered?
- 27 What is the square root of forty thousand?
- 28 Look at the right-angled triangle. Work out the height of the triangle.
- 29 Look at the grid. What is the equation of the line marked B?
- 30 Nine multiplied by nine has the same value as three to the power what?

'Put your pens down. The test is finished.'

Time: 10 seconds continued		Time: 15 seconds continued													
17	2cm by 8cm by 4cm cm ³	26	<table border="1"> <thead> <tr> <th>Number of milk bottles</th> <th>Frequency</th> </tr> </thead> <tbody> <tr><td>0</td><td>6</td></tr> <tr><td>1</td><td>3</td></tr> <tr><td>2</td><td>8</td></tr> <tr><td>3</td><td>1</td></tr> <tr><td>4</td><td>2</td></tr> </tbody> </table>	Number of milk bottles	Frequency	0	6	1	3	2	8	3	1	4	2
Number of milk bottles	Frequency														
0	6														
1	3														
2	8														
3	1														
4	2														
18	m £4.50 £27	27	$\sqrt{40000}$												
19	cm 8cm	28													
20	£ 1 : 3 £150	29													
21	$y(y-3)$	30	9×9												
Time: 15 seconds															
22	$27 \times 32 = 864$ $27 \times 16 =$ <input type="text"/>														
23															
24	<input type="text"/> 50														
25															

Key stage 3 mathematics 2006
Mental mathematics higher tiers Test A

Test A

Mark scheme

Time: 5 seconds

1	8	
2	30	
3	54	
4	80 mm	
5	-8	
6	999 999	Do not accept responses given in words

Time: 5 seconds continued

7	3.7	Do not accept equivalent fractions or decimals
8	$7y^2$	

Time: 10 seconds

9	3 pupils	
10	5 cm	
11	$\frac{1}{8}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$ $\frac{3}{4}$	
12	130 °	
13	10	
14	3 km	
15	$\frac{2}{3}$	Accept equivalent probabilities, including 0.66, 0.67 or better, or their percentage equivalents
16	£ 15	Do not accept incorrect % signs

Time: 10 seconds continued

17	64 cm ³	
18	6 m	
19	24 cm	
20	£ 200	
21	18	

Time: 15 seconds

22	432	
23	60	
24	1500	
25	7 $\frac{1}{2}$ cm	Accept equivalent fractions or decimals

Time: 15 seconds continued

26	30	
27	200	Accept -200 with 200 or alone
28	6	Ignore units given
29	$x = 2$	Accept unconventional notation, eg $1x = 2$, $x1 - 2 = 0$
30	4	Accept embedded values, eg 3^4

Higher tiers Test B questions

'Now we are ready to start the test.

For the first group of questions you will have 5 seconds to work out each answer and write it down.'

1	A teacher divides a class of thirty pupils into six equal groups. How many pupils are in each group?
2	Write eighty-eight thousand in figures.
3	Write the number that is halfway between a half and one.
4	What is the area of a rectangle with a width of six centimetres and a length of seven centimetres?
5	Ninety-seven per cent of the Earth's water is salt water. The rest is fresh water. What percentage of the Earth's water is fresh water?
6	Divide twenty-four by minus six.
7	To the nearest metre the height of a building is twelve metres. What is the least value the height of the building could be?

'For the next group of questions you will have 10 seconds to work out each answer and write it down.'

8	A teacher asked some pupils which flavour drink they preferred. The bar chart shows the results. Twenty pupils said orange. About how many said lime?
9	A lesson starts at two forty-five and finishes at three twenty. How long is the lesson in minutes?
10	Look at the triangle on the grid. Write the coordinates of the point marked A.
11	Look at the diagram. Work out the size of angle x.
12	Look at the expression on your answer sheet. Write it as simply as possible.
13	Look at the numbers on your answer sheet. What is their mean?
14	A sunflower is one hundred and fifty centimetres tall. How tall will it be if its height increases by ten per cent?
15	There are thirty cubes in a bag. I am going to take out one cube at random. The probability that it will be blue is two-fifths. How many blue cubes are in the bag?

'Now turn over your answer sheet.'

Pupil answer sheet

Key stage 3 mathematics 2006
Mental mathematics Test B

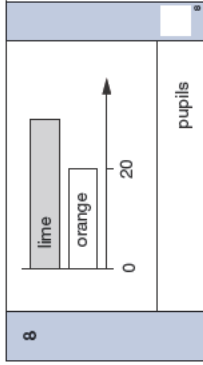
First name _____

Last name _____

School _____

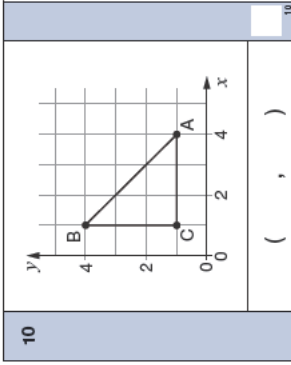
Total marks

Time: 10 seconds



9

minutes	2:45	3:20
---------	------	------



Time: 5 seconds

1

	30
--	----

2

--	--

3

$\frac{1}{2}$	1
---------------	---

4

cm^2	
---------------	--

5

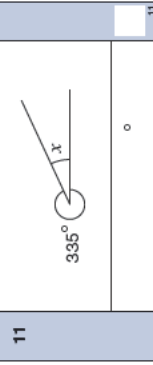
%	97%
---	-----

6

	-6
--	----

7

m	
---	--



12

	$5k + 2m + 3m + 4k$
--	---------------------

13

	22	18	10	30
--	----	----	----	----

14

cm	150 cm	10%
----	--------	-----

15

	30	$\frac{2}{5}$
--	----	---------------

16	The ratio of boys to girls in a class is three to five. There are twelve boys. How many girls are there?
17	The rectangle on your answer sheet has been enlarged by a scale factor of two. Write down the dimensions of the rectangle before the enlargement.
18	Look at the expression on your answer sheet. What is the value of this expression when y is four?
19	A 3-D shape has exactly six faces. All six faces are rectangles. What is the name of the 3-D shape?
20	From three-quarters, subtract nought point two.
21	A car travelled two kilometres in five minutes. What was the car's average speed in kilometres per hour?

'For the next group of questions you will have 15 seconds to work out each answer and write it down.'

22	Write a multiple of nine that is bigger than seventy and smaller than eighty.
23	Look at the pattern on the square grid. Shade two more squares so that the grid has two lines of symmetry.
24	Your answer sheet shows the answer to seven multiplied by fifty-eight. Use this information to help you work out the answer to three and a half multiplied by fifty-eight.
25	Forty-four people paid twenty-five pence each to go into a book sale. How much money is that altogether?
26	In a box of pens, one half are black, one sixth are red and the rest are blue. What fraction of the pens is blue?
27	On the grid, sketch the straight line with equation y equals x plus two.
28	What is the square root of nine twenty-fifths?
29	Some people were asked which colour car they preferred. The pie chart shows the results. What percentage of the people said blue?
30	m squared equals one hundred. Write down the two possible values of m plus fifteen.

'Put your pens down. The test is finished.'

Time: 10 seconds continued		Time: 15 seconds continued							
16	<table border="1"><tr><td></td><td>3 : 5</td><td></td></tr></table>		3 : 5		24	$7 \times 58 = 406$ $3\frac{1}{2} \times 58 =$ <table border="1"><tr><td></td></tr></table>			
	3 : 5								
17	<table border="1"><tr><td style="text-align: center;">3cm</td></tr><tr><td style="text-align: center;">2cm</td></tr><tr><td style="text-align: center;">_____ cm and _____ cm</td></tr></table>	3cm	2cm	_____ cm and _____ cm	25	£ <table border="1"><tr><td>44</td></tr></table> 25p <table border="1"><tr><td></td></tr></table>	44		
3cm									
2cm									
_____ cm and _____ cm									
44									
18	<table border="1"><tr><td></td><td>$\frac{1}{2}y^2$</td><td></td></tr></table>		$\frac{1}{2}y^2$		26	<table border="1"><tr><td></td><td>$\frac{1}{2}$</td><td>$\frac{1}{6}$</td></tr></table>		$\frac{1}{2}$	$\frac{1}{6}$
	$\frac{1}{2}y^2$								
	$\frac{1}{2}$	$\frac{1}{6}$							
19	<table border="1"><tr><td></td></tr></table>		27						
20	<table border="1"><tr><td></td><td>$\frac{3}{4}$</td><td>0.2</td></tr></table>		$\frac{3}{4}$	0.2	28	<table border="1"><tr><td></td><td>$\sqrt{\frac{9}{25}}$</td></tr></table>		$\sqrt{\frac{9}{25}}$	
	$\frac{3}{4}$	0.2							
	$\sqrt{\frac{9}{25}}$								
21	<table border="1"><tr><td></td><td>km/h</td><td>$\frac{2\text{km}}{5\text{ minutes}}$</td></tr></table>		km/h	$\frac{2\text{km}}{5\text{ minutes}}$	29				
	km/h	$\frac{2\text{km}}{5\text{ minutes}}$							
Time: 15 seconds									
22	<table border="1"><tr><td></td><td>70</td><td>80</td></tr></table>		70	80	30	$m^2 = 100$ $m + 15$ and _____			
	70	80							
23									

Key stage 3 mathematics 2006
Mental mathematics higher tiers Test B

Test B

Mark scheme

Time: 10 seconds

8 $25 \leq \text{answer} \leq 35$

Do not accept incorrect % signs

9 35 minutes

10 (4 , 1)

11 25°

12 $9k + 5m$

13 20

14 165 cm

15 12
Accept embedded values,
eg $\frac{12}{30}$

Time: 5 seconds

1 5

2 88 000
Do not accept responses
given in words

3 $\frac{3}{4}$
Accept equivalent
fractions or decimals

4 42 cm^2

5 3 %

6 -4

7 11.5 m
Accept equivalent
fractions or decimals

Time: 10 seconds continued

16	20	Do not accept 12 : 20
-----------	-----------	--------------------------

17	1 cm and $1\frac{1}{2}$ cm	
	Accept pair in either order Accept equivalent fractions or decimals	

18	8	
-----------	----------	--

19	Cuboid	Accept 'rectangular prism' Condone 'cube' or 'square prism'
-----------	---------------	---

20	0.55	Accept equivalent fractions or decimals
-----------	-------------	--

21	24 km/h	
-----------	----------------	--

Time: 15 seconds

22	72	Do not accept 8×9
-----------	-----------	-------------------------------

23		or
-----------	--	----

Time: 15 seconds continued

24	203	
-----------	------------	--

25	£ 11	
-----------	-------------	--

26	$\frac{1}{3}$	Accept equivalent fractions but do not accept equivalent decimals
-----------	---------------	--

27		
	Accept line at least two diagonals in length, and line not drawn accurately, provided the pupil's intention is clear	

28	$\frac{3}{5}$	Accept equivalent fractions or decimals Accept $-\frac{3}{5}$ with $\frac{3}{5}$ or alone
-----------	---------------	--

29	20 %	Do not accept equivalent fractions or decimals
-----------	-------------	---

30	5 and 25	Accept pair in either order
-----------	-----------------	--------------------------------

EARLY YEARS

NATIONAL
CURRICULUM
5–16

GCSE

GNVQ

GCE A LEVEL

NVQ

OTHER
VOCATIONAL
QUALIFICATIONS

Further teacher packs may be purchased (for any purpose other than statutory assessment) by contacting:

QCA Orderline, PO Box 29, Norwich NR3 1GN

tel: 08700 606015; fax: 08700 606017

email: orderline@qca.org.uk

Order ref: QCA/06/1923

270044