

Ma

KEY STAGE

3

LOWER TIER &
HIGHER TIERS

2004

Mathematics tests

Mark schemes for Mental mathematics Tests A, B and C

2004



department for

education and skills

creating opportunity, releasing potential, achieving excellence

First published in 2004

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Introduction

This booklet contains the mark schemes for the higher tiers tests (Tests A and B) and the lower tier test (Test C). 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	Your answer sheet shows the price of a book. How much is the book, to the nearest pound?
2	Multiply four by four.
3	Subtract forty-eight from seventy.
4	What is fifty per cent of ten?
5	Look at the equation. Find the value of k .
6	What is half of two-thirds?

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

7	In a local swimming pool, thirty-two lengths is half a mile. How many lengths is one mile?
8	I bought three tickets for a concert. The total cost was forty-five pounds. How much was one ticket?
9	Your answer sheet shows part of a train timetable. How long does the journey take from Twyford to Maidenhead?
10	What is one quarter of sixty?
11	What is the perimeter of this square?
12	Look at the numbers. Put a ring round the median.
13	Look at the scale. About what value is the arrow pointing to?
14	My birthday is twenty-two days after my friend's birthday. This year my friend's birthday is on a Monday. On what day will my birthday be this year?
15	The longest flight of stairs in the world is in Switzerland. Your answer sheet shows how many stairs there are. Write this number to the nearest thousand.
16	Look at the numbers. What is the largest number that will divide exactly into both of these numbers?

'Now turn over your answer sheet.'

Pupil answer sheet

Key stage 3 mathematics 2004
Mental mathematics Test C

First name

Last name

School

Total marks

Time: 10 seconds

7

lengths

32

7

8

£

£45

8

9

Reading
Twyford
Maidenhead
Slough
Paddington

10:45
10:54
11:02
11:14
11:38

minutes

9

Practice question

20

10

60

10

11

cm

10cm

11

12

4

9

10

13

20

12

Time: 5 seconds

1

£

£16.55

1

2

2

3

70

3

4

50%

4

5

$k - 20 = 40$

5

6

$\frac{2}{3}$

6

13

1

2

3

13

14

22 days

14

15

11 674

15

16

12 20

16

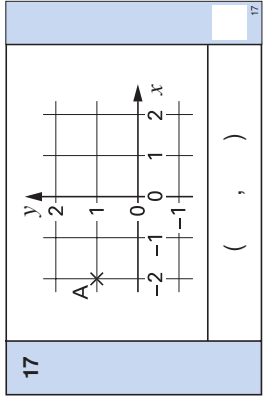
17	On the grid is a point marked A. Write the coordinates of this point.
18	What is the next number in the sequence of square numbers? One, four, nine, sixteen ...
19	The chart shows the number of males and females who are members of a sports club. There are thirty males in the club. About how many females are there?
20	There are fourteen girls and thirteen boys in a class. What is the probability that a pupil chosen at random will be a girl?
21	Estimate the size of the angle, in degrees.
22	Look at the equation. When a is ten, what is the value of b ?

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

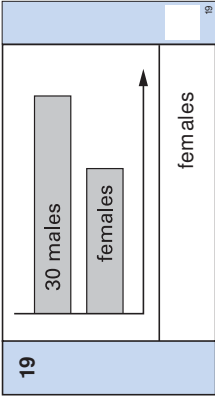
23	Look at the cube. I am going to hang it from the corner marked with an arrow. When it is hanging, which corner will be lowest? Mark the correct corner with a cross.
24	The diagram shows three circles. Shade the part of the diagram where all three circles overlap.
25	Look at the price list. I buy one sandwich, one yoghurt and two apples. How much money is that altogether?
26	In a survey, pupils were asked if they liked playing sport. Twenty pupils said yes. How many pupils said no?
27	Write three even numbers that add to twenty.
28	Work out the size of angle a .
29	What is the remainder when you divide three hundred by twenty-nine?
30	Look at the types of quadrilaterals on your answer sheet. Which of them must have sides that are all the same length? Ring the correct ones.

‘Put your pens down. The test is finished.’

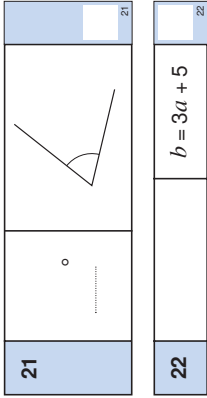
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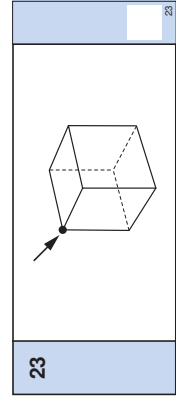
17 (,)



18 1, 4, 9, 16, ...

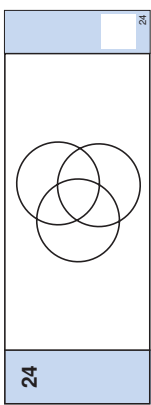


19 30 males, females

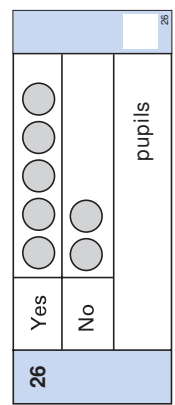


20 14 girls, 13 boys

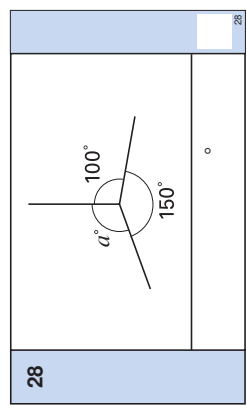
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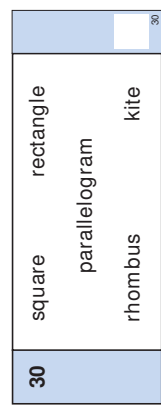
21 (,)



22 1, 4, 9, 16, ...

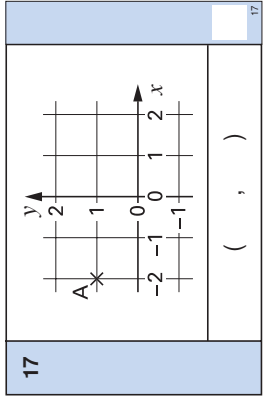


23 30 males, females

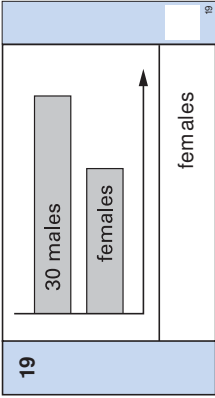


24 14 girls, 13 boys

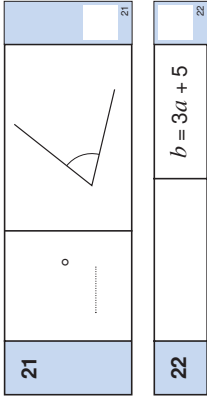
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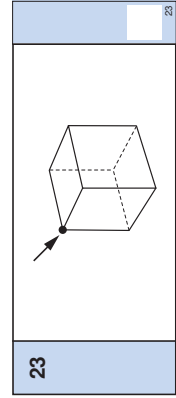
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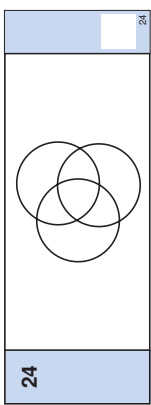


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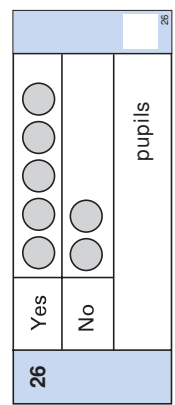


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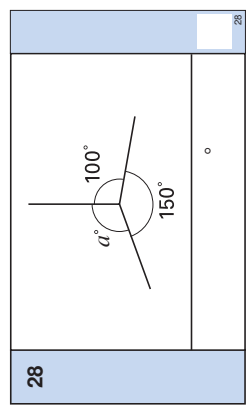
Time: 15 seconds continued



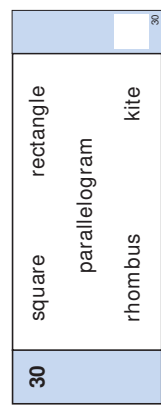
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22 1, 4, 9, 16, ...

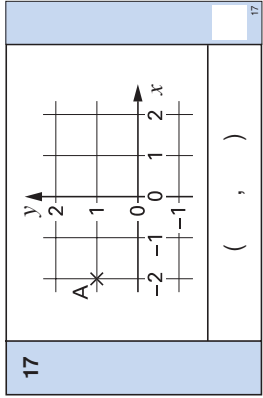


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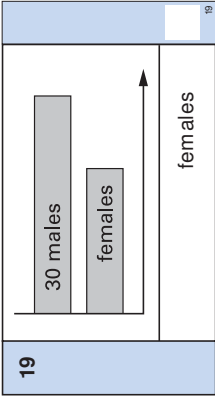


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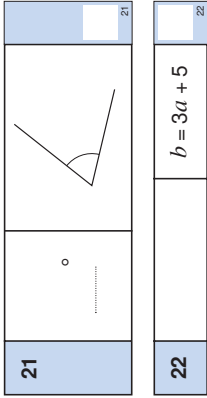
Time: 15 seconds



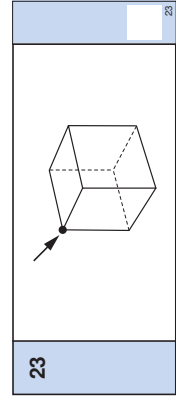
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18 1, 4, 9, 16, ...

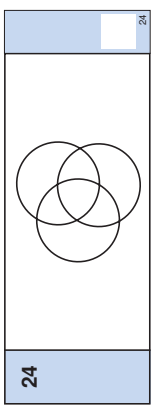


19 30 males, females

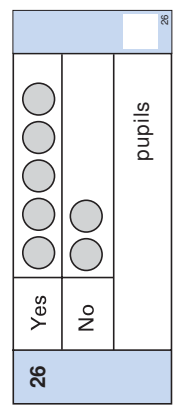


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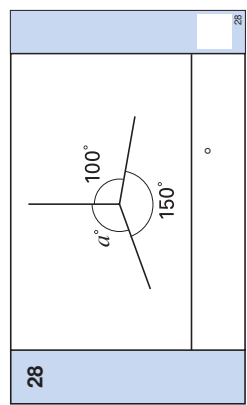
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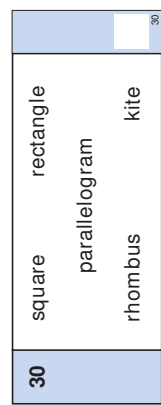
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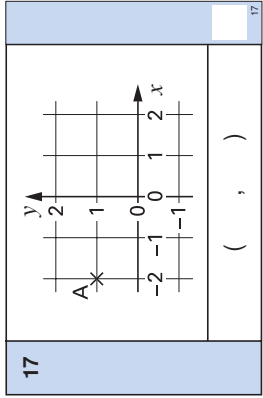


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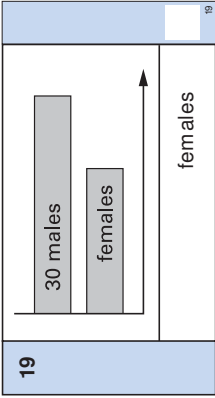


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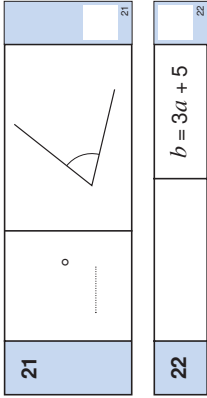
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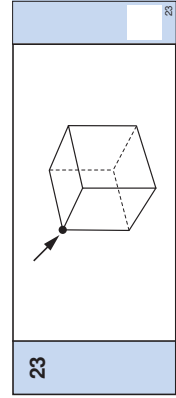
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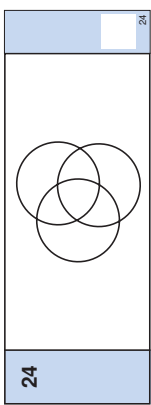


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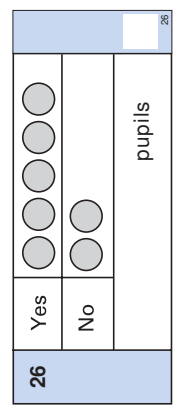


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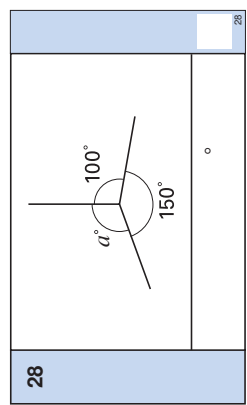
Time: 15 seconds continued



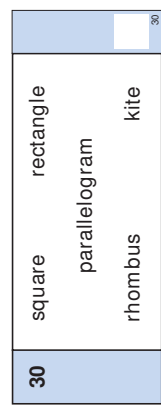
21 (,)



22 1, 4, 9, 16, ...



23 30 males, females



24 14 girls, 13 boys

Key stage 3 mathematics 2004
Mental mathematics lower tier Test C

Test C

Mark scheme

Time: 5 seconds

1	£ 17 (.00)	
2	16	
3	22	
4	5	Do not accept 5%
5	60	
6	1	Accept equivalent fractions or 0.33(...)

Time: 10 seconds

7	64 lengths	
8	£ 15 (.00)	
9	8 minutes	
10	15	
11	40 cm	
12	4 9 10 13 20	
13	$1.7 \leq \text{answer} \leq 1.8$	
14	Tuesday	Accept unambiguous abbreviation, eg Tues, Tu, but do not accept if ambiguous, eg T
15	12 000	Do not accept 12
16	4	Accept value repeated, eg 4 and 4, but do not accept if ambiguous, eg 4 + 4

Time: 10 seconds continued

17	(-2, 1)	
----	-----------	--

18	25	Do not accept 5^2 or 5×5
----	----	--

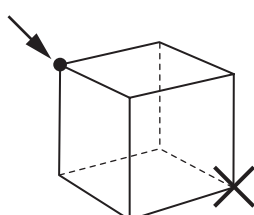
19	$18 \leq \text{answer} \leq 22$ females	
----	---	--

20	14	Accept equivalent probabilities, including 0.51(...) or 0.52 or equivalent percentages
----	----	--

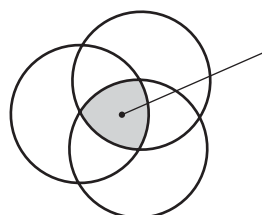
21	$55^\circ \leq \text{answer} \leq 75^\circ$	
----	---	--

22	35	
----	----	--

Time: 15 seconds

23		
----	---	--

Time: 15 seconds continued

24		
----	--	--

25	£ 2.85	
----	--------	--

26	8 pupils	
----	----------	--

27	Any three even numbers that add to 20	Accept repeated numbers, eg 2, 2, 16 0, 0, 20
----	---------------------------------------	--

28	110°	
----	-------------	--

29	10	Accept embedded response, eg 10 r10
----	----	-------------------------------------

30	<div>square</div> <div>rectangle</div> <div>parallelogram</div>	
----	---	--

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	How many sides does an octagon have?
2	Divide forty-two by seven.
3	What number is the arrow pointing to on the number line?
4	Centimetres are a measure of length. What are square centimetres a measure of?
5	Look at the expression. 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.'

6	How many minutes are there in five hours?
7	In a survey people were asked if they had a mobile phone. The percentage bar chart shows the results. What percentage of people said yes?
8	I have a bag that contains twenty-pence coins. Altogether, I have twelve pounds. How many twenty-pence coins is that?
9	Add together the fractions on your answer sheet.
10	Look at the equation. When y equals forty-six, what is the value of x ?
11	There are seven red and three blue balls in a bag. I am going to take a ball out of the bag at random. What is the probability that the ball will be blue?
12	Increase one pound fifty by fifty per cent.
13	Look at the triangle. What is the size of the angle marked a ?
14	Subtract eleven from four.
15	What is the sum of the angles in a rhombus?

'Now turn over your answer sheet.'

Pupil answer sheet

Key stage 3 mathematics 2004
Mental mathematics Test A

First name _____
Last name _____
School _____

Total marks

Time: 10 seconds

6

minutes

6

7

no

yes

0%100%

%

7

8

£12

8

9

$\frac{2}{7}$

$\frac{1}{7}$

9

10

$y = 2x + 6$

10

11

7 red

3 blue

11

12

£

£1.50

50%

12

13

75°

75°

a

°

13

14

°

14

15

°

15

Practice question

60

9

Time: 5 seconds

1

1

11

2

2

12

3

2.4

2.5

3

4

4

14

5

$7n^2 - n^2$

5

16	It takes me one and a half minutes to swim one length of the pool. How many lengths can I swim in fifteen minutes?
17	To the nearest whole number, what is the square root of eighty-three point nine?
18	A circle has radius r . What is the formula for the area of the circle?
19	Write an equation that shows that k is one more than twice m .
20	One hundred pet owners had a dog or a cat, or both. Fifty-five of the hundred had a dog. Sixty-five had a cat. How many had both a dog and a cat?
21	What must I multiply n squared by to get five n cubed?

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

22	The hands of a clock are at right angles. The minute hand is pointing to twelve. What could the hour hand be pointing to? There are two answers. Write them both.
23	The most popular months to get married are July, August and September. The table shows the percentages of marriages that are in those months. What percentage of marriages are not in those months?
24	Look at the fractions. Which of them are less than a half? Ring your answers.
25	A club played twenty-four games in a season. They won the same number of games as they lost. Use the pie chart to work out how many games they won.
26	The angles in a triangle are k , k plus ten and k plus twenty. What is the value of k ?
27	A solid pyramid has seven faces. What shape is its base?
28	Write three numbers that have a mean of ten and a range of two.
29	The diagram shows a quadrilateral. Work out its area.
30	The first odd number is one. What is the hundredth odd number?

‘Put your pens down. The test is finished.’

Time: 10 seconds continued

16	lengths	15	16
----	---------	----	----

17		83.9	17
----	--	------	----

18			18
----	--	--	----

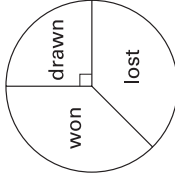
19	k is one more than twice m		19
----	--------------------------------	--	----

20		55	65	20
----	--	----	----	----

21		n^2	$5n^3$	21
----	--	-------	--------	----

Time: 15 seconds continued

24	$\frac{1}{50}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{1}{10}$	$\frac{3}{7}$	24
----	----------------	---------------	---------------	----------------	---------------	----

25			25
----	---	--	----

26	k	$(k + 10)$	$(k + 20)$	26
----	-----	------------	------------	----

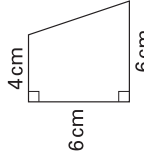
27			27
----	--	--	----

28		mean 10	range 2	28
----	--	---------	---------	----

Time: 15 seconds

22	 or	22
----	----------------	----

23		
	July	12%
	August	14%
	September	13%
		%

29		cm ²	29
----	---	-----------------	----

30		30
----	--	----

Key stage 3 mathematics 2004
Mental mathematics higher tiers Test A

Test A

Mark scheme

Time: 5 seconds

1	8	
---	---	--

2	6	
---	---	--

3	2.43	Accept equivalent fractions or decimals
---	------	---

4	Area	
---	------	--

5	$6n^2$	Do not accept unsimplified expressions, eg $6 \times n^2$
---	--------	---

Time: 10 seconds

6	300 minutes	
---	-------------	--

7	40 %	Do not accept equivalent fractions or decimals
---	------	--

8	60	
---	----	--

9	3	Accept equivalent fractions or 0.42(...)
---	---	--

10	20	
----	----	--

11	3	Accept equivalent probabilities
----	---	---------------------------------

12	£ 2.25	
----	--------	--

13	30 °	
----	------	--

14	– 7	Do not accept 7–
----	-----	------------------

15	360 °	
----	-------	--

Time: 10 seconds continued

16	10 lengths	
----	-------------------	--

17	9	
----	----------	--

18	πr^2	Accept equivalent formulae, eg $\pi \times r \times r$, $A = \pi r^2$
----	-----------	--

19	$k = 2m + 1$	Accept equivalent equations, eg $2 \times m + 1 = k$
----	--------------	--

20	20	
----	-----------	--

21	$5n$	Accept $5 \times n$
----	------	---------------------

Time: 15 seconds

22	3 and 9	Accept in either order
----	-----------------------	------------------------

23	61 %	Do not accept equivalent fractions or decimals
----	-------------	--

Time: 15 seconds continued

24	$\frac{1}{50}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{1}{10}$ $\frac{3}{7}$	
----	---	--

25	9	
----	----------	--

26	50	Accept 50°
----	-----------	------------

27	Hexagon	Do not accept a description of a hexagon, eg 6-sided
----	----------------	---

28	Any three numbers that total 30 and have a range of 2 eg 9, 10, 11	
----	--	--

29	30 cm ²	
----	---------------------------	--

30	199	
----	------------	--

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	How many hundreds are there in one thousand?
2	I asked people whether they used the internet last week. The pie chart shows the results. What percentage of people said no?
3	How many lines of symmetry does a rectangle have?
4	Ten per cent of a number is seven. What is the number?
5	Multiply minus six by minus two.

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

6	A magazine costs one pound forty pence. I buy two of them and pay with a five pound note. How much change should I get?
7	How many days are there in seven weeks and one day?
8	What is the smallest whole number that is divisible by five and by three?
9	I face south-west, then I turn through one hundred and eighty degrees. What direction am I facing now?
10	Multiply eight point seven by two.
11	Look at the polygon. What is its mathematical name?
12	Tariq won one hundred pounds in a maths competition. He gave two-fifths of his prize money to charity. How much of his prize money, in pounds, did he have left?
13	I am thinking of a number. I call it n . I double my number then I subtract three. Write an expression to show the result.
14	An event is certain to happen. Which number on your answer sheet represents its probability? Ring it.
15	Look at the grid. It is made from two sets of parallel lines. The angle marked is one hundred and forty degrees. On the grid, mark two different angles that are forty degrees.
16	Look at the equation. What is the value of x ?
17	What percentage of fifty pounds is thirty-five pounds?

‘Now turn over your answer sheet.’

Pupil answer sheet

Key stage 3 mathematics 2004
Mental mathematics Test B

First name _____
Last name _____
School _____

Total marks

Time: 10 seconds

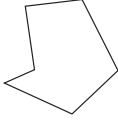
6 £ £ 1.40

7 days

8

9 SW

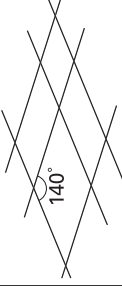
10 8.7

11 

12 £ $\frac{2}{5}$

13 n

14 0 $\frac{1}{2}$ 1 50 100

15 

16 $34 - 2x = 14$

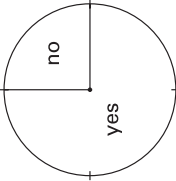
17 % £50

Practice question

60

Time: 5 seconds

1

2 

3

4 $34 - 2x = 14$

5 % £50

18	Multiply out the brackets.
19	The instructions for a fruit drink say to mix one part blackcurrant juice with four parts water. I want to make one litre of this fruit drink. How much blackcurrant juice should I use? Give your answer in millilitres.
20	A rectangular picture measures six centimetres by four centimetres. I enlarge the picture so that the longer side measures nine centimetres. What does the shorter side measure?
21	Look at the sequence of numbers. What could an expression for the n th term be?

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

22	The scale drawing shows a lake. I walk around the perimeter of this lake. Use the scale to estimate how many kilometres I walk.
23	The answer sheet shows the cost of theatre tickets. Mrs Jones wants to go with some children to the theatre. In total, she does not want to spend more than twenty-five pounds. What is the greatest number of children she can take?
24	The net of a triangular prism is made from triangles and rectangles. How many of each shape are needed?
25	I am going to throw a fair eight-sided dice, numbered twelve to nineteen. What is the probability that I will throw a prime number?
26	Four people went running. The graph shows the time taken and the distance travelled by each of the four. Write the letter of the person who had the greatest average speed.
27	Twenty different families were asked how many children they had. The table shows the results. Altogether, how many children are there in the twenty families?
28	Look at the calculation. Write down an approximate answer.
29	Look at the diagram. What is the equation of the line marked A?
30	I pay five pounds for a book and a magazine. The book costs four pounds more than the magazine. How much does the book cost?

‘Put your pens down. The test is finished.’

Time: 10 seconds continued

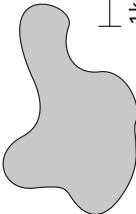
18		$4(7 - y)$	18
----	--	------------	----

19	ml	1 litre	19
----	----	---------	----

20			20
		cm	

21		1, 4, 9, 16, ...	21
----	--	------------------	----

Time: 15 seconds

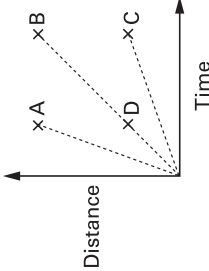
22			22
		km	

23	Each adult	£6.99	23
	Each child	£3.99	

24	triangles rectangles		24
----	-------------------------------------	--	----

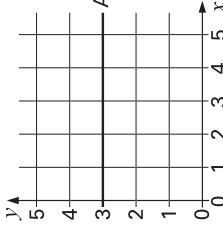
25		12 to 19	25
----	--	----------	----

Time: 15 seconds continued

26			26
----	---	--	----

27	<table border="1"> <thead> <tr> <th>Number of children</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>3</td> </tr> <tr> <td>1</td> <td>6</td> </tr> <tr> <td>2</td> <td>6</td> </tr> <tr> <td>3</td> <td>5</td> </tr> </tbody> </table>		Number of children	Frequency	0	3	1	6	2	6	3	5	27
Number of children	Frequency												
0	3												
1	6												
2	6												
3	5												

28		$\frac{40.04 \pm 29.8}{9.83}$	28
----	--	-------------------------------	----

29			29
----	---	--	----

30	£		30
----	---	--	----

Test B

Mark scheme

Time: 5 seconds

1	10	
---	----	--

2	25 %	Do not accept equivalent fractions or decimals
---	------	--

3	2	
---	---	--

4	70	Do not accept 70%
---	----	-------------------

5	12	Accept +12
---	----	------------

Time: 10 seconds

6	£ 2.20	
---	--------	--

7	50 days	
---	---------	--

8	15	
---	----	--

9	North-east	Accept unambiguous abbreviation, eg NE, and unconventional ordering, eg East-north
---	------------	--

10	17.4	Accept equivalent fractions or decimals
----	------	---

11	Hexagon	Do not accept a description of a hexagon, eg 6-sided
----	---------	--

12	£ 60	
----	------	--

13	$2n - 3$	Accept unsimplified expressions, eg $2 \times n - 3$
----	----------	--

14	0 1 1 50 100	
----	--	--

15	Indicates any two 40° angles , with none incorrect	
----	---	--

16	10	
----	----	--

17	70 %	
----	------	--

Time: 10 seconds continued

18	$28 - 4y$	Accept use of multiplication sign within $4y$, eg $28 - 4 \times y$
19	200 ml	
20	6 cm	
21	n^2	Accept $n \times n$

Time: 15 seconds

22	11 km $\leq$ answer $\leq$ 17 km	
23	4	
24	2 triangles 3 rectangles	
25	3	Accept equivalent probabilities

Time: 15 seconds continued

26	A	
27	33	
28	115 $\leq$ answer $\leq$ 125	
29	$y = 3$	Accept equivalent equations
30	£ 4.50	

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