

Ma

KEY STAGE

3

LOWER TIER &  
HIGHER TIERS

2005

Mathematics tests

Mark schemes for  
Mental mathematics  
Tests A, B and C

2005



department for

**education and skills**

creating opportunity, releasing potential, achieving excellence

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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

Pupil answer sheet

Time: 5 seconds continued

6	<input type="text"/>	°	<input type="text"/>	6
7	<input type="text"/>	$\frac{3}{9}$	<input type="text"/>	7
8	<input type="text"/>	$3m + m$	<input type="text"/>	8

Key stage 3 mathematics 2005 Mental mathematics Test C		Total marks <input type="text"/>
First name	<input type="text"/>	
Last name	<input type="text"/>	
School	<input type="text"/>	

Time: 10 seconds

9	£	50p	<input type="text"/>	9
10		25 28	<input type="text"/>	10
11		10:30am	<input type="text"/>	11
12	125, 115, 105, .....	<input type="text"/>	<input type="text"/>	12
13	<input type="text"/>	<input type="text"/>	<input type="text"/>	13

Practice question

<input type="text"/>	90	<input type="text"/>
----------------------	----	----------------------

Time: 5 seconds

1	<input type="text"/>	<input type="text"/>	1	
2	<input type="text"/>	<input type="text"/>	2	
3	$b = 14 + a$	<input type="text"/>	3	
4	<input type="text"/>	<input type="text"/>	4	
5	<input type="text"/>	9300	<input type="text"/>	5

14	-1°C	2°C	5°C	0°C	-3°C	<input type="text"/>	14
----	------	-----	-----	-----	------	----------------------	----

15			people	<input type="text"/>	15
----	--	--	--------	----------------------	----

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 five hundred and eight.
2	What do you need to add to eighty-three to make one hundred?
3	Look at the equation on your answer sheet. When $a$ equals seven, what is the value of $b$ ?
4	What number multiplied by eight equals forty-eight?
5	Look at the number on your answer sheet. Divide it by one hundred.
6	What is the sum of the angles in a triangle?
7	Write the fraction on your answer sheet in its simplest form.
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	I buy a notebook for fifty pence. How much change should I get from a two pound coin?
10	Look at the numbers on your answer sheet. Add them.
11	A train leaves at ten thirty am and travels for four hours. At what time does the train stop? Write your answer using am or pm.
12	I am counting back in steps of ten. One hundred and twenty-five, one hundred and fifteen, one hundred and five, ... Write down the next number.
13	What is half of seven?
14	Look at the temperatures on your answer sheet. Put a ring round the temperature that is the lowest.
15	Six hundred people went on holiday. The pie chart shows how they travelled. How many people travelled by car?

'Now turn over your answer sheet.'

16	Write down an even number that is a multiple of seven.
17	Two rulers cost eighty pence. How much do three rulers cost?
18	How many seconds are there in one and a half minutes?
19	There were two thousand people at a concert. Nine hundred and ninety-two of them were women. How many of the people were not women?
20	Look at the numbers on your answer sheet. Work out their range.
21	The temperature was minus two degrees Celsius. At night the temperature fell by seven degrees. What was the temperature at night?
22	Look at the shaded triangle drawn on a centimetre square grid. What is the area of this triangle?
23	What is twenty per cent of sixty pounds?
24	Look at the triangle on the grid. Write the coordinates of the point marked A.

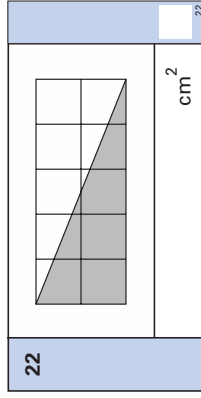
**'For the next group of questions you will have 15 seconds to work out each answer and write it down.'**

25	People at a shopping centre voted for their favourite fruit drink. The bar chart shows the results. Altogether, how many people voted?
26	I face west, then I turn through two right angles. What direction am I facing now?
27	Look at the shape made from small equilateral triangles. Shade two more triangles so that the shape has three lines of symmetry.
28	I am thinking of two numbers that add to ten. The two numbers multiply together to make twenty-one. What are my two numbers?
29	Which one of the shapes on your answer sheet is the net of a cube? Put a tick inside the correct shape.
30	I have twenty-five cards. Sixteen of them show even numbers and the rest show odd numbers. I am going to take a card at random. What is the probability that the card will show an odd number?

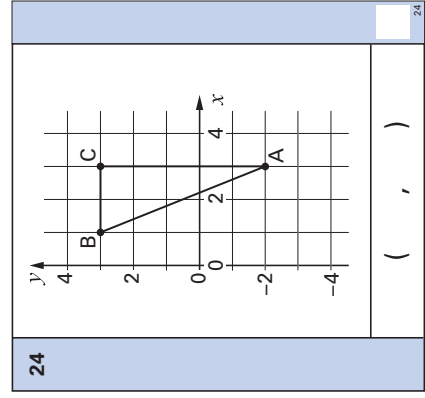
**'Put your pens down. The test is finished.'**

Time: 10 seconds continued

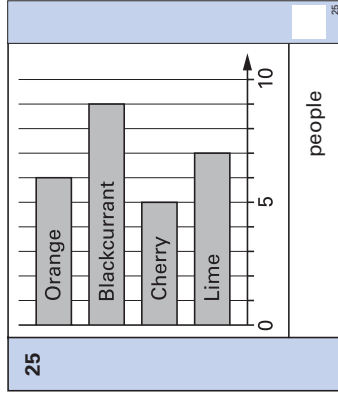
16		16
17	£	80p
18	seconds	18
19	2000	992
20	3, 8, 3, 1, 4	20
21	°C	-2°C



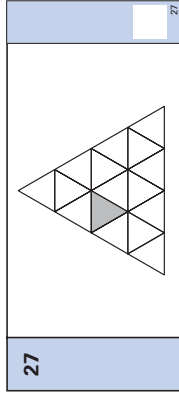
23	£	£60	23
----	---	-----	----



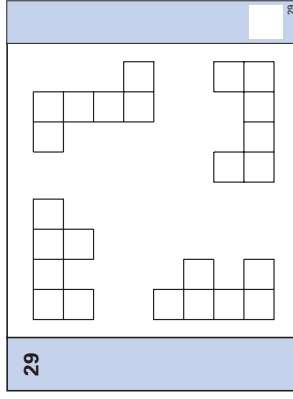
Time: 15 seconds



26		W	26
----	--	---	----



28	..... and .....	28
----	-----------------	----



30	25 cards	16 even numbers	30
----	----------	-----------------	----

Key stage 3 mathematics 2005  
Mental mathematics lower tier Test C

# Test C

## Mark scheme

6	180 °	
---	-------	--

7	$\frac{1}{3}$	Do not accept equivalent fractions or decimals
---	---------------	--

8	4m	
---	----	--

Time: 10 seconds

9	£ 1.50	
---	--------	--

10	53	
----	----	--

11	2:30 pm	Accept 14:30(pm) Do not accept 2:30 without pm
----	---------	---

12	95	
----	----	--

13	$3\frac{1}{2}$	Accept equivalent fractions or decimals
----	----------------	---

Time: 5 seconds

1	508	Do not accept responses given in words
---	-----	--

2	17	Accept embedded value, eg 83 + 17
---	----	-----------------------------------

3	21	
---	----	--

4	6	Accept embedded value, eg 6 × 8
---	---	---------------------------------

5	93	
---	----	--

14	$-1^{\circ}\text{C}$ $5^{\circ}\text{C}$ $-3^{\circ}\text{C}$ $2^{\circ}\text{C}$ $0^{\circ}\text{C}$	
----	--	--

15	150 people	
----	------------	--

<b>16</b>	<b>Any number that is a multiple of 14, eg 14 or 700</b>
	Accept zero, and negative multiples of 14

<b>17</b>	<b>£ 1.20</b>	
-----------	---------------	--

<b>18</b>	<b>90 seconds</b>	
-----------	-------------------	--

<b>19</b>	<b>1008</b>	
-----------	-------------	--

<b>20</b>	<b>7</b>	Do not accept 8 - 1
-----------	----------	---------------------

<b>21</b>	<b>-9 °C</b>	
-----------	--------------	--

<b>22</b>	<b>5 cm<sup>2</sup></b>	
-----------	-------------------------	--

<b>23</b>	<b>£ 12</b>	
-----------	-------------	--

<b>24</b>	<b>( 3 , -2 )</b>	
-----------	-------------------	--

<b>25</b>	<b>27 people</b>	
-----------	------------------	--

<b>26</b>	<b>East</b>	Accept any unambiguous indication of East, eg E
-----------	-------------	---

<b>27</b>	
-----------	--

<b>28</b>	<b>3 and 7</b>	Accept pair in either order
-----------	----------------	-----------------------------

<b>29</b>	
-----------	--

<b>30</b>	<b><math>\frac{9}{25}</math></b>	Accept equivalent probabilities
-----------	----------------------------------	---------------------------------



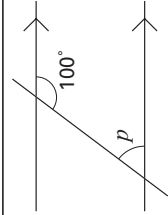
Pupil answer sheet

Time: 5 seconds continued

Key stage 3 mathematics 2005  
Mental mathematics Test A

First name \_\_\_\_\_  
Last name \_\_\_\_\_  
School \_\_\_\_\_

Total marks

6		6.2	6
7			7
8		3.795	8

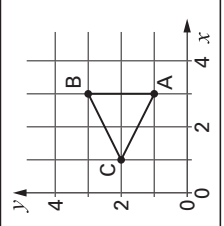
Practice question

	38	12
--	----	----

Time: 10 seconds

9	m	1cm : 5m	9
10		3 5	10
11	°	60° 70°	11
12	7, 4, 1,	....., .....	12
13		6g + 4h + 3g - 2h	13
14		18 9	14
15	cm	20cm 7cm	15
16		5% 16	16
17		32 - 2a = 24	17

Time: 5 seconds

1		54	1
2		( , )	2
3			3
4	mm	1 m	4
5		$\frac{3}{5}$	5

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 sixes are there in fifty-four?
2	Look at your answer sheet. Write the coordinates of the point marked A.
3	The population of France is approximately sixty-one million. Write this number in figures.
4	How many millimetres are there in one metre?
5	Write a different fraction that is equivalent to three-fifths.
6	What is six point two multiplied by one thousand?
7	Look at the diagram. The lines marked with arrows are parallel. What is the size of angle $p$ ?
8	Round three point seven nine five to one decimal place.

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

9	The scale on a map is one centimetre to five metres. On the map the length of a street is eight centimetres. What is the real length of the street in metres?
10	Write down a number that is a multiple of three and is also a multiple of five.
11	Two of the angles in a triangle are sixty degrees and seventy degrees. What is the size of the third angle?
12	I start at seven and count down in equal steps; seven, four, one. Write down the next two numbers.
13	Look at the expression on your answer sheet. Write it as simply as possible.
14	What is eighteen multiplied by nine?
15	The perimeter of a rectangle is twenty centimetres. Its length is seven centimetres. What is the width of the rectangle?
16	Five per cent of a number is sixteen. What is twenty-five per cent of the number?
17	Look at the equation on your answer sheet. What is the value of $a$ ?

'Now turn over your answer sheet.'



18	Estimate the value of nine point two multiplied by two point nine.
19	I drive ten kilometres in twelve minutes. What is my average speed in kilometres per hour?
20	Look at the expression on your answer sheet. Multiply out the brackets.

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

21	The pictogram shows the number of girls and boys in a youth club. How many more girls than boys are in the youth club?
22	The pie chart shows the colour of cars in a car park. There were twelve blue cars. Approximately, how many cars were there altogether?
23	When $a$ equals minus three and $b$ equals minus seven, what is the value of $a$ minus $b$ ?
24	The mean of three numbers is six. Two of the numbers are five. What is the third number?
25	A circle has a radius of six centimetres. Give an approximate value for the circumference of the circle.
26	What is two-thirds of three-quarters of eighty?
27	Look at the frequency table showing the number of people travelling in cars. Altogether, how many people were travelling?
28	A rectangle has an area of eight square centimetres. What is the area of a rectangle with sides that are all twice as long?
29	Look at the graphs. Put a ring round the graph that has the equation $y$ equals $x$ plus one.
30	Look at the numbers on your answer sheet. Write down the number that is halfway between them.

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

Time: 10 seconds continued

18	9.2	2.9	18
19	10km	12 minutes	18
		km/h	
20	$2a(a + 4)$		20

Time: 15 seconds

21	<table border="1"> <tr> <td>Girls</td> <td></td> </tr> <tr> <td>Boys</td> <td></td> </tr> </table> <p> = 4 people</p>	Girls		Boys		21
Girls						
Boys						

22		22
----	--	----

23	$a = -3$ $b = -7$ $a - b$	23
----	------------------------------	----

24	5   5   5   .....	24
----	-------------------	----

Time: 15 seconds continued

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

26	$\frac{2}{3}$ $\frac{3}{4}$ 80	26
----	--------------------------------	----

27	<table border="1"> <tr> <td>No. of people</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Frequency</td> <td>5</td> <td>4</td> <td>0</td> <td>1</td> </tr> </table> <p>people</p>	No. of people	1	2	3	4	Frequency	5	4	0	1	27
No. of people	1	2	3	4								
Frequency	5	4	0	1								

28	$\text{cm}^2$ $8 \text{ cm}^2$	28
----	--------------------------------	----

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

30	$\frac{2}{5}$ 1	30
----	-----------------	----

# Test A

## Mark scheme

6	6200	
7	80 °	
8	3.8	Do not accept equivalent fractions or decimals

### Time: 5 seconds

1	9	Accept embedded values, eg $9 \times 6$
2	( 3 , 1 )	
3	61 000 000	Do not accept responses given in words
4	1000 mm	Do not accept amended units
5	Any fraction equivalent to $\frac{3}{5}$ (except $\frac{3}{5}$ ), eg $\frac{6}{10}$ , $\frac{30}{50}$	
	Do not accept equivalent decimals	

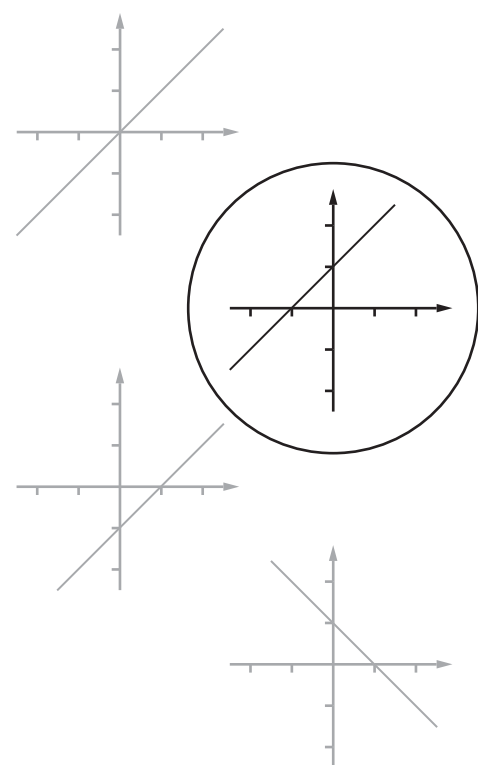
### Time: 10 seconds

9	40 m	
10	Any number that is a multiple of 15, eg 15, 30, 300	
	Accept zero, and negative multiples of 15	
11	50 °	
12	-2 and -5	Accept pair in either order
13	$9g + 2h$	
14	162	
15	3 cm	
16	80	Do not accept incorrect % signs
17	4	Accept embedded values, eg $32 - 2 \times 4$

18	$26 \leq \text{answer} \leq 28$	
19	50 km/h	
20	$2a^2 + 8a$	Do not accept equivalent expressions containing brackets, eg $2(a^2 + 4a)$

Time: 15 seconds

21	6	
22	$32 \leq \text{answer} \leq 40$	
23	4	
24	8	

25	$36 \text{ cm} \leq \text{answer} \leq 38 \text{ cm}$	
26	40	
27	17 people	
28	$32 \text{ cm}^2$	
29	 <p>The figure shows three separate coordinate systems, each with a horizontal x-axis and a vertical y-axis. Both axes have tick marks. The top-left graph shows a line with a positive slope passing through the origin. The bottom-left graph shows a line with a positive slope that intersects the y-axis at a positive value. The bottom-right graph shows a line with a negative slope that intersects the y-axis at a positive value. A circle is drawn around the top-right graph, which shows a line with a positive slope intersecting the y-axis at a positive value.</p>	
30	$\frac{7}{10}$	Accept equivalent fractions or decimals Do not accept incorrect notation, eg $\frac{3.5}{5}$

Pupil answer sheet

**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	What is forty-two multiplied by ten?
2	Look at the numbers on your answer sheet. Write down the number that is the mode.
3	How many centimetres are there in three-quarters of a metre?
4	Look at the expression on your answer sheet. Write it as simply as possible.
5	What number is eight less than minus four?
6	Write one and a half million in figures.
7	Round two point six nine four to one decimal place.
8	The length of a piece of string is fourteen centimetres to the nearest centimetre. What is the minimum length this piece of string could be?
9	What is the gradient of the line with equation $y$ equals two $x$ plus three?

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

10	Write down a factor of thirty-six that is greater than ten and less than twenty.
11	A train journey began at ten thirty-five am and ended at eleven fifteen am. How long was the train journey in minutes?
12	Drinks cost twenty-eight pence each. What is the greatest number of these drinks I can buy with one pound?
13	Put a cross on the grid to show the point with coordinates minus two, one.
14	The probability I will be late for school is one-twentieth. What is the probability that I will not be late for school?

'Now turn over your answer sheet.'

Key stage 3 mathematics 2005  
 Mental mathematics Test B

First name \_\_\_\_\_

Last name \_\_\_\_\_

School \_\_\_\_\_

Total marks

Time: 5 seconds continued

6	<input type="text"/>	6
7	<input type="text"/>	2.694
8	<input type="text"/>	cm 14 cm
9	<input type="text"/>	$y = 2x + 3$

Practice question

<input type="text"/>	38	12	<input type="text"/>
----------------------	----	----	----------------------

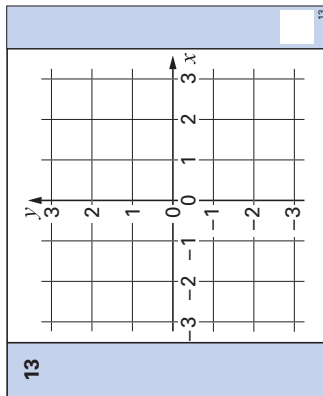
Time: 10 seconds

10	<input type="text"/>	36	<input type="text"/>
11	10:35am	11:15am	minutes

Time: 5 seconds

1	<input type="text"/>	42	<input type="text"/>
2	6 6 5 7	5 5 8	<input type="text"/>
3	cm	$\frac{3}{4}$	<input type="text"/>
4	<input type="text"/>	$5a + 3a$	<input type="text"/>
5	<input type="text"/>	-4	<input type="text"/>

12	<input type="text"/>	28p	£1	<input type="text"/>
----	----------------------	-----	----	----------------------



14	<input type="text"/>	$\frac{1}{20}$	<input type="text"/>
----	----------------------	----------------	----------------------

15	Look at the diagram on your answer sheet. What is the area of the rectangle?
16	How many thirds are there in two?
17	Look at the trapezium. Angle $a$ is one hundred and ten degrees. What is the size of angle $b$ ?
18	Solve the equation, $l$ plus three-fifths equals one.
19	Last month my telephone bill was thirty pounds. This month it is twenty per cent more. How much is this month's bill?
20	Look at the expression on your answer sheet. Its value is eighty-two. Write an expression using $a$ and $b$ with a value of forty-one.
21	What is three-quarters of a half?
22	Your answer sheet shows the $n$ th term of a sequence. What is the sixth term in this sequence?
23	Work out the value of two to the power six divided by two squared.

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

24	Look at the two points on the square grid. Put one more cross on the grid so that the three points join to form an isosceles triangle.
25	Look at the calculation on your answer sheet. Write an approximate answer.
26	Ten out of thirty-six people said they ate toast for breakfast. What angle should represent this on a pie chart?
27	Look at the circle with radius three. One of the values below is its area. Put a ring round the correct value.
28	Look at the numbers on your answer sheet. Put them in order of size starting with the smallest.
29	Write two numbers with a mean of six and a range of four.
30	A cube has a volume of eight cubic centimetres. What is the volume of a cube with edges that are all twice as long?

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

Time: 10 seconds continued

15

4 cm

6 cm

cm<sup>2</sup>

15

16

$\frac{1}{3}$     2

16

17

$^{\circ}$

17

18

$l + \frac{3}{5} = 1$

18

19

£    £30    20%

19

20

$6a + 4b$     82

20

21

$\frac{3}{4}$      $\frac{1}{2}$

21

22

$\frac{1}{2}n(n+1)$

22

23

$\frac{2^6}{2^2}$

23

Time: 15 seconds

24

24

25

$\frac{52}{1.4 + 3.6}$

25

26

$^{\circ}$      $\frac{10}{36}$

26

27

3

$3\pi$      $6\pi$      $9\pi$

$12\pi$      $15\pi$

27

28

0.4     $\frac{1}{5}$     25%

....., ....., .....

28

29

..... and .....

6    4

29

30

cm<sup>3</sup>    8cm<sup>3</sup>

30

# Test B

## Mark scheme

6	1500 000	Do not accept responses given in words
7	2.7	Do not accept equivalent fractions or decimals
8	13.5 cm	Accept equivalent fractions or decimals
9	2	Accept $\frac{2}{1}$

### Time: 10 seconds

10	12 or 18	
11	40 minutes	
12	3	Accept reference to the remainder, even if incorrect, eg 3 rem 16

### Time: 5 seconds

1	420	
2	5	
3	75 cm	Do not accept amended units
4	$8a$	
5	-12	

13

Accept inaccurate indication, provided the pupil's intention is clear

14	$\frac{19}{20}$	Accept equivalent probabilities
----	-----------------	---------------------------------

15	24 cm <sup>2</sup>	
----	--------------------	--

16	6	Accept embedded values, eg $\frac{6}{3}$
----	---	---

17	70 °	
----	------	--

18	$\frac{2}{5}$	Accept equivalent fractions or decimals Accept embedded values, eg $\frac{2}{5} + \frac{3}{5}$
----	---------------	--

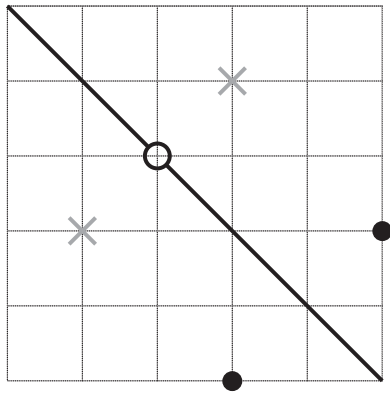
19	£ 36	
----	------	--

20	<p><b>3a + 2b or equivalent</b> or <b>6a + 4b - 41</b></p>	
	Accept correct expressions equated to 41	

21	$\frac{3}{8}$	Accept equivalent fractions, decimals or percentages
----	---------------	--

22	21	Do not accept incomplete processing, eg 3(6 + 1)
----	----	---

23	16	Do not accept incomplete processing, eg 2 <sup>4</sup>
----	----	---

24	<p>Indicates a point on the line, excluding the circle, or one of the points marked</p> 	
	Accept inaccurate indication, provided the pupil's intention is clear	

25	$10 \leq \text{answer} \leq 10.5$	
	Do not accept incomplete processing, eg $\frac{52}{5}$	

26	100 °	
----	-------	--

27	<p>3π                      6π                      <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">9π</span></p> <p>12π                      15π</p>	
----	---	--

28	$\frac{1}{5}$ , 25%, 0.4	Accept any unambiguous indication of the correct order, eg 0.2, 0.25, 0.4
----	--------------------------	--

29	4 and 8	Accept pair in either order
----	---------	-----------------------------

30	64 cm <sup>3</sup>	
----	--------------------	--



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

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