

2024 national curriculum tests

# Key stage 2

## Mathematics

### Paper 3: reasoning

First name						
Middle name						
Last name						
Date of birth	Day		Month		Year	
School name						
DfE number						



**[BLANK PAGE]**

Please do not write on this page.



## Instructions

You **must not** use a calculator to answer any questions in this test.

### Questions and answers

You have **40 minutes** to complete this test.

Follow the instructions for each question.

Work as quickly and as carefully as you can.

If you need to do working out, you can use the space around the question.

Do not write over any barcodes.

**Some questions have a method box like this:**

Diagram illustrating a method box. The box is a large grid with a rounded left side containing the text "Show your method". A smaller, empty rectangular box is positioned on the right side of the grid.

For these questions, you may get a mark for showing your method.

If you cannot do a question, **go on to the next one**.

You can come back to it later, if you have time.

If you finish before the end, **go back and check your work**.

### Marks

The number under each line at the side of the page tells you the number of marks available for each question.

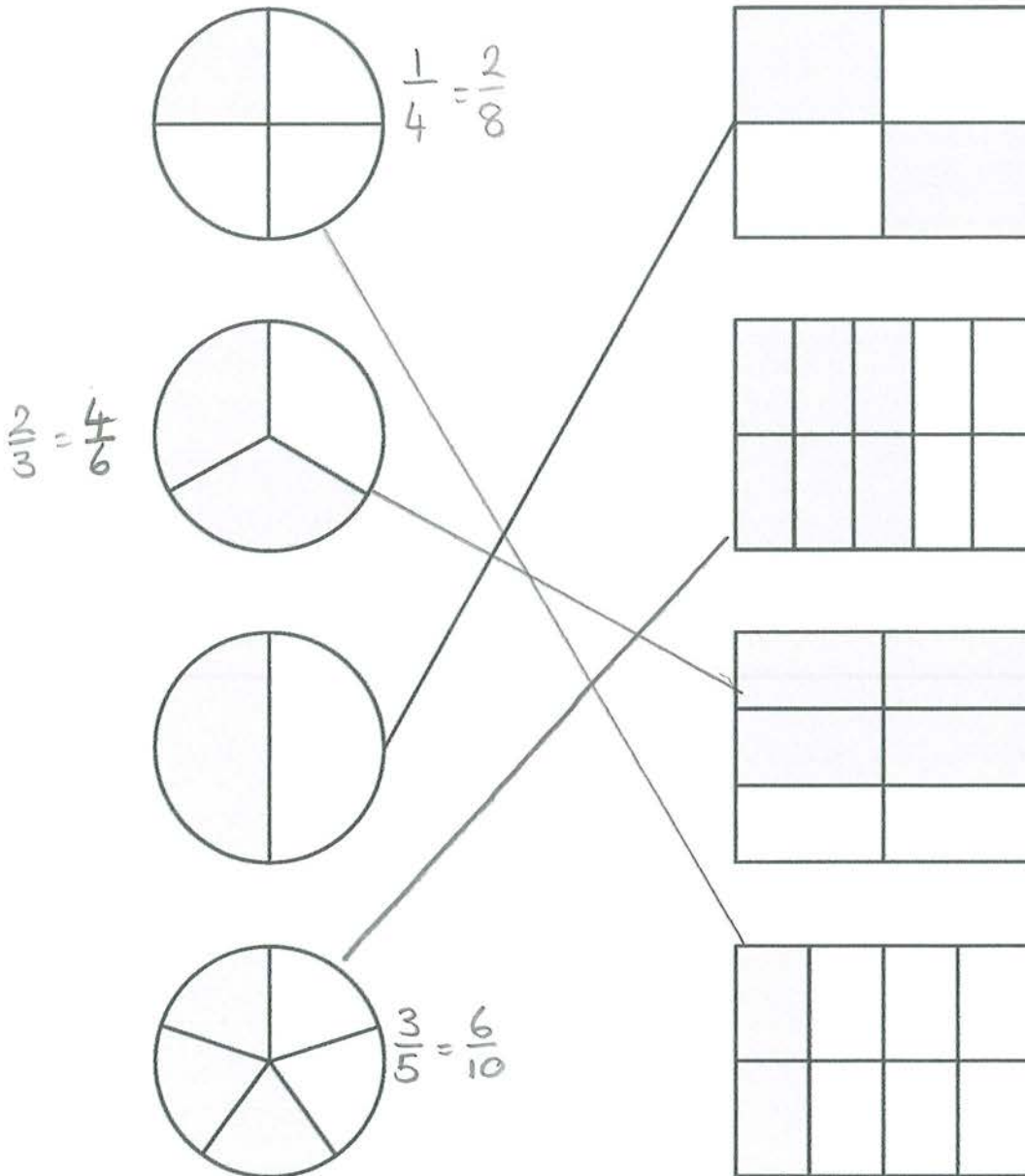


1

These shapes have a fraction shaded.

Match each shaded fraction of a circle to the same shaded fraction of a rectangle.

One has been done for you.



1 mark

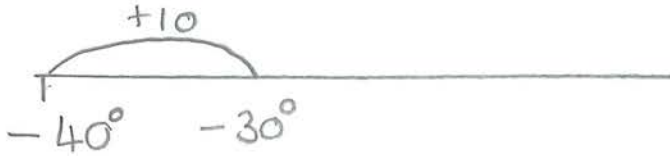


2

The temperature in a freezer is  $-40^{\circ}\text{C}$ .

The temperature increases by  $10^{\circ}\text{C}$ .

What is the new temperature?



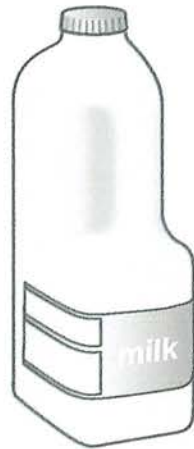
$-30^{\circ}\text{C}$

1 mark



3

Jack buys milk and orange juice from a shop.



£1.45



£2.40

He pays with a £5 note.

How much **change** does Jack get?

Show  
your  
method

$$\begin{array}{r} 1.45 \\ + 2.40 \\ \hline 3.85 \end{array} \quad \begin{array}{r} 4.90 \\ - 3.85 \\ \hline 1.15 \end{array}$$

£ 1.15

2 marks



4

The diameter of the Moon is 3,476 kilometres.

What is this diameter to the nearest hundred kilometres?

T H T U  
3 4 7 6  
      →

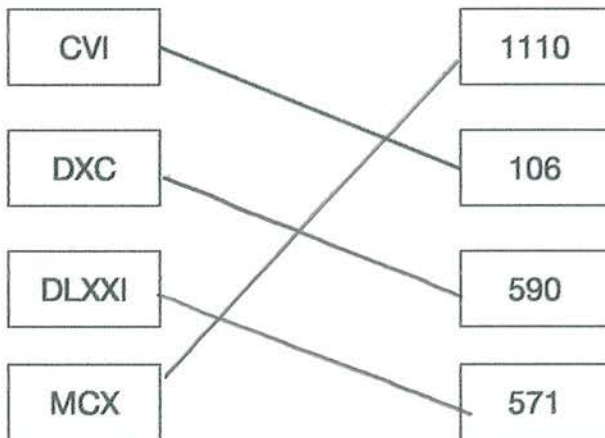
3500 km

1 mark

5

Match each of these Roman numerals to the correct number.

One has been done for you.



I = 1  
V = 5  
X = 10  
L = 50  
C = 100  
D = 500  
M = 1000

1 mark



6

Match each fraction to its equivalent simplified fraction.

One has been done for you.

Fraction	Simplified fraction
$\frac{12}{20} \div 4$	$\frac{4}{5}$
$\frac{12}{15} \div 3$	$\frac{2}{3}$
$\frac{12}{16} \div 4$	$\frac{3}{5}$
$\frac{12}{18} \div 6$	$\frac{3}{4}$

1 mark

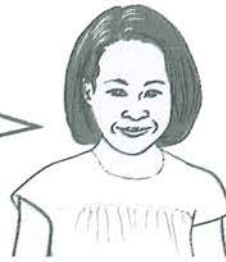




7

Emma thinks of a number. She says,

I multiply by 2  
I add 11  
I divide by 3  
My answer is 9



What number did Emma think of?

Remember to work backwards  
and undo each step by doing  
the inverse.

$$9 \times 3 = 27$$

$$27 - 11 = 16$$

$$16 \div 2 = 8$$

8

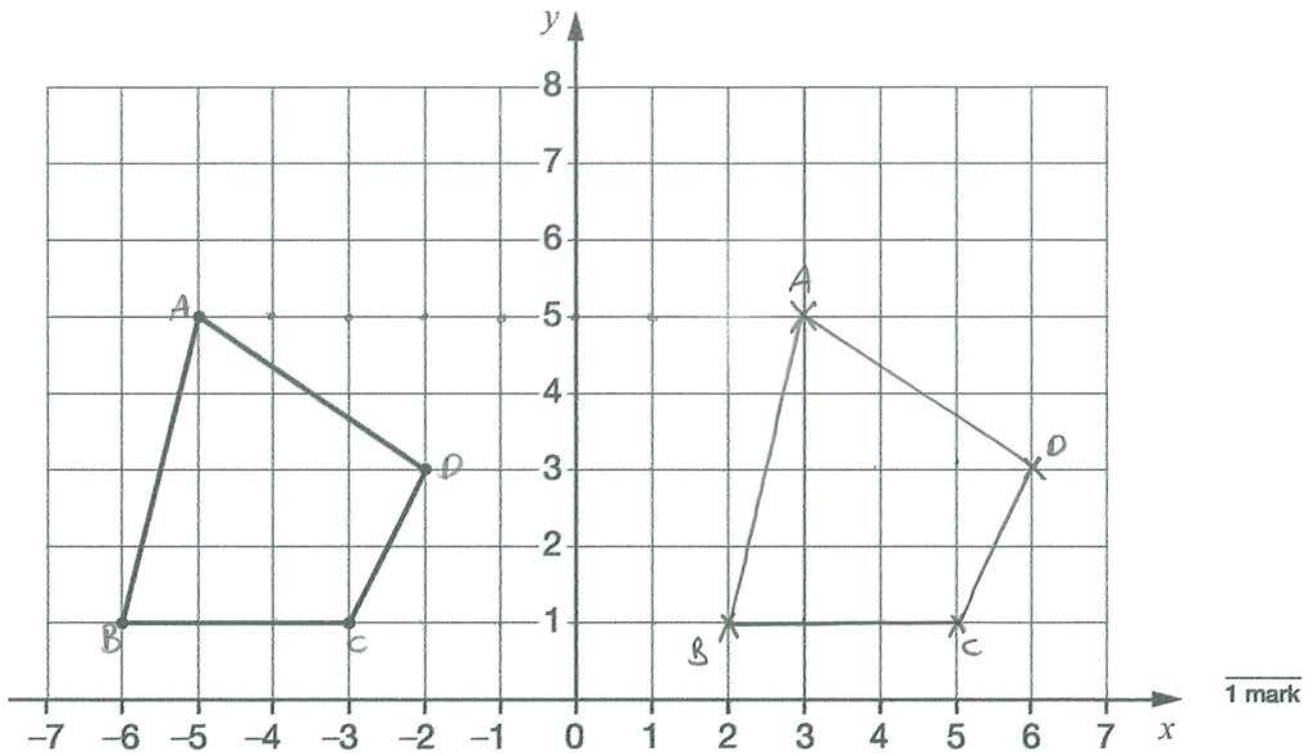
1 mark



8

Here is a shape.

Draw the shape after it is translated 8 units to the right.



1 mark

Use a ruler.

Label each point and translate individually.



9

Write the missing numbers in the table.

Number of weeks	Number of days
1	7
2	14
4	28
6	42
10	70
15	105

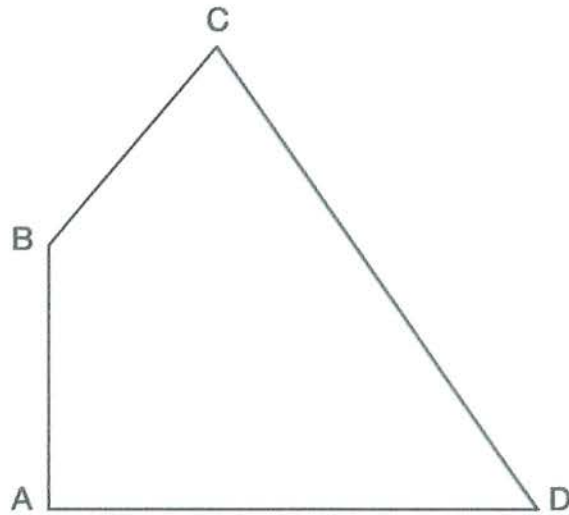
1 mark

$$6 \times 7 = 42$$

$$10 \times 7 = 70$$

$$\begin{array}{r} 15 \\ 7 \overline{)105} \end{array}$$



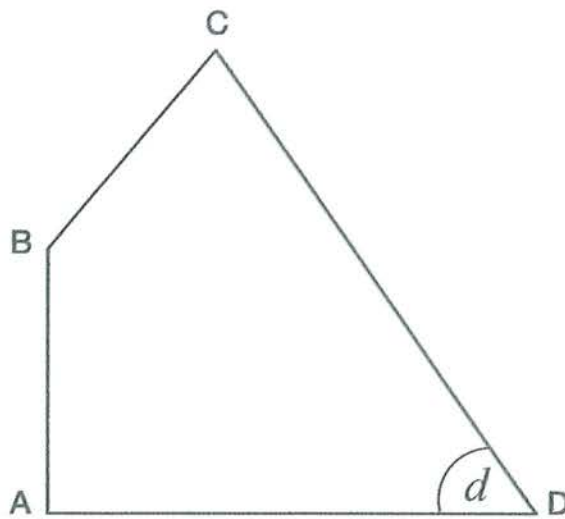


What is the perimeter of the shape, in millimetres?

Use a ruler.

210 mm

1 mark



Measure the size of angle  $d$ .

Use an angle measurer.

$d$  is 55°

1 mark



11

Write the missing digits to make this **subtraction** correct.

$$\begin{array}{r}
 5 \overset{61}{\cancel{7}} \boxed{3} \\
 - 3 \boxed{0} 5 \\
 \hline
 \boxed{2} 6 8
 \end{array}$$

2 marks

12

Here are four fractions.

$$\boxed{\frac{70}{80}}$$

$$\boxed{\frac{1}{5}}$$

$$\boxed{\frac{3}{4} \frac{6}{8}}$$

$$\boxed{\frac{8}{10} \frac{4}{5} \frac{64}{80}}$$

Write the fractions in order starting with the least.

$$\boxed{\frac{1}{5}}$$

$$\boxed{\frac{3}{4}}$$

$$\boxed{\frac{8}{10}}$$

$$\boxed{\frac{7}{8}}$$

least

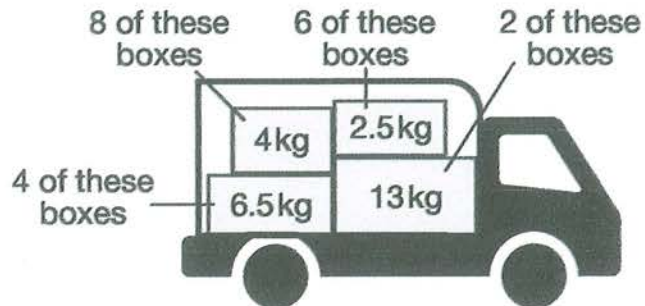
1 mark



13

There are 20 boxes on a truck.

The boxes are in 4 different sizes.



What is the **total mass** of the 20 boxes on the truck?

Show your method

$8 \times 4 = 32$		32	
$13 \times 2 = 26$	+	26	
$6 \times 2.5 = 15$	+	26	
$4 \times 6.5 = 26$	+	15	
		<u>99</u>	
		99	kg

2 marks



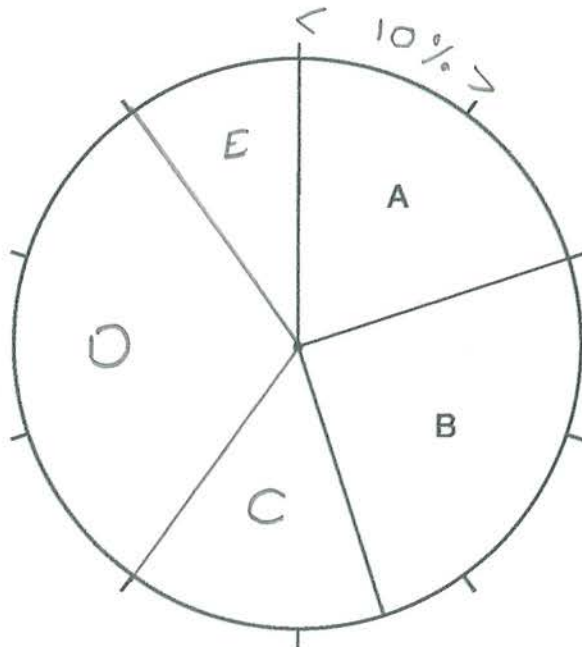
14

Look at the data in this table.

Label	Percentage
A	20%
B	25%
C	15%
D	30%
E	10%

Using this data, draw **two** lines and write **three** labels to complete the pie chart.

Use a ruler.



2 marks



15

35% of the 680 pupils at a school have a pet dog.

159 of the pupils who have a pet dog are boys.

How many of the pupils who have a pet dog are girls?

Show  
your  
method

$10\% \text{ of } 680 = 68$		
$5\% \text{ of } 680 = 34$		
$\begin{array}{r} 68 \\ \times 3 \\ \hline 204 \\ \hline \end{array}$	$\begin{array}{r} 204 \\ + 34 \\ \hline 238 \\ \hline \end{array}$	$\begin{array}{r} 238 \\ - 159 \\ \hline 79 \\ \hline \end{array}$
		<div style="border: 1px solid black; padding: 5px; display: inline-block;">79</div>

2 marks





16

Write a number in the box to make this correct.

$$\frac{3}{5} < \frac{\boxed{65}}{100} < 0.7$$

$$\frac{60}{100} \qquad \frac{70}{100}$$

1 mark

17

Tick the numbers that are factors of both 54 and 72

- 2  (54)  $1 \times 54$   $2 \times 27$   $3 \times 18$   $9 \times 6$
- 3  (72)  $2 \times 36$   $3 \times 24$   $4 \times 18$   $8 \times 9$
- 4
- 8
- 9

1 mark



18

Layla wants to buy a camera that costs £65



For the first 10 weeks, she saves £2 each week.

Then she saves £3 each week.

How many weeks **altogether** does it take Layla to save £65?

Show  
your  
method

$$w \underline{10} \times 2 = \underline{\pounds 20}$$

$$10 + 15 = 25$$

$$65 - 20 = \underline{\pounds 45}$$

$$45 \div 3 = \underline{15}w$$

**25 weeks**

2 marks

19

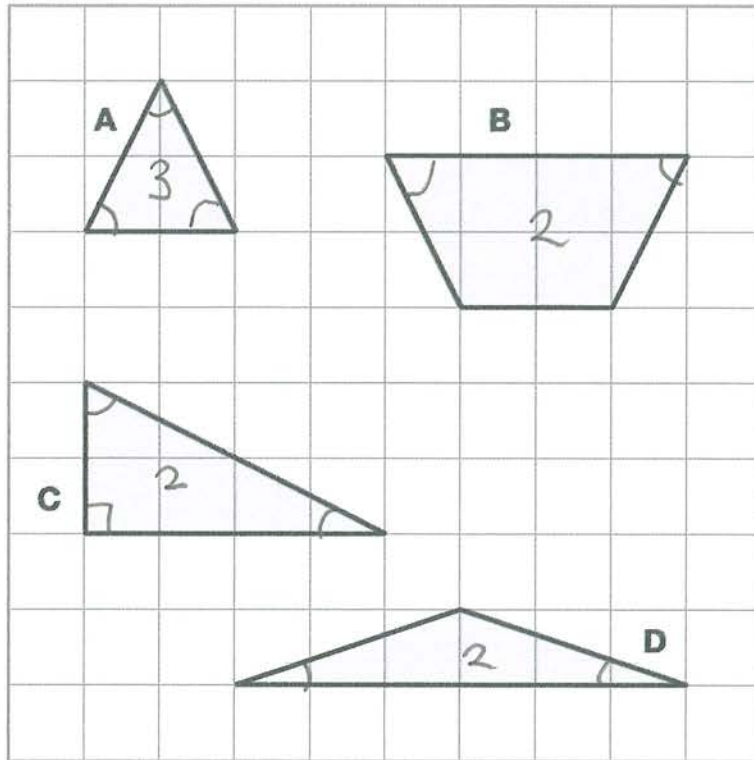
Complete this division.

$$\begin{array}{r}
 \boxed{3} \ 6 \ 4 \ r1 \\
 12 \overline{) 4 \ 3 \ 7 \ 6 \ 4 \ \boxed{9}} \\
 \underline{- 3 \ 6 \ 0 \ 0} \\
 \phantom{12} \ 7 \ 6 \ ? \\
 \underline{- 7 \ 2 \ 0} \\
 \phantom{12} \ 4 \ ? \\
 \phantom{12} \ 4 \ 8
 \end{array}$$

2 marks

20

Here are four shapes on a grid.



Write the letters of **all** the shapes that have **only two** acute angles.

B C & D

1 mark



21

A band holds a concert for charity.

The tickets cost £27 each.

They sell 635 tickets.

They pay £3,180 to use the hall.

They give one-third of the **remaining** amount to charity.

How much money does the band give to charity?

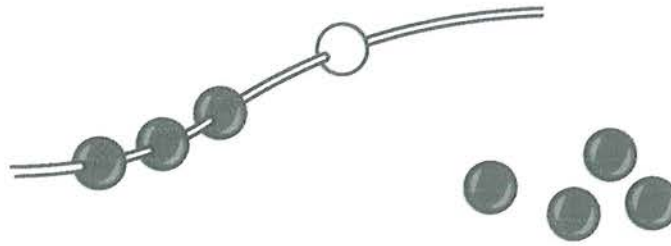
Show  
your  
method

	$\begin{array}{r} 635 \\ \times 27 \\ \hline 4445 \\ 12700 \\ \hline 17145 \end{array}$	$\begin{array}{r} 6'0 \\ 171'45 \\ - 3180 \\ \hline 13965 \end{array}$
	$\begin{array}{r} 04655 \\ 3 \overline{) 13965} \end{array}$	
		<p>£ 4655</p>

3 marks



Sarah makes jewellery using black and white beads.



She uses this rule to work out how many black beads to use.

$$\text{black} = (\text{white} \times 3) + 4$$

Sarah uses 12 **white** beads to make a necklace.

How many black beads does she use?

$$B = (12 \times 3) + 4$$

$$B = 36 + 4$$

$$B = 40$$

40

1 mark

Sarah uses 25 **black** beads to make a bracelet.

How many white beads does she use?

$$25 = (w \times 3) + 4$$

$$25 - 4 = 21$$

$$21 = (w \times 3)$$

$$21 = (7 \times 3)$$

7

1 mark



23

Complete the table.

Name of 3-D shape	Number of faces
cube	6
pentagonal prism	7
triangular-based pyramid	4

1 mark

24

 $\frac{1}{2} \times \frac{5}{6}$  is greater than the value of  $\frac{1}{3} \times \frac{7}{8}$ 

Explain how you know.

$$\frac{1}{2} \times \frac{5}{6} = \frac{5}{12} \quad \frac{1}{3} \times \frac{7}{8} = \frac{7}{24}$$

$$\frac{5}{12} = \frac{10}{24} \quad \frac{10}{24} > \frac{7}{24}$$

1 mark



**[END OF TEST]**

Please do not write on this page.





Standards  
& Testing  
Agency

2024 key stage 2 mathematics

Paper 3: reasoning

Print version product code: STA/24/8819/p ISBN: 978-1-83507-013-0

Electronic PDF version product code: STA/24/8819/e ISBN: 978-1-83507-034-5

**For more copies**

Additional copies of this book are not available during the test window.

They can be downloaded afterwards from

<https://www.gov.uk/government/collections/national-curriculum-assessments-practice-materials>.

© Crown copyright 2024

**Re-use of Crown copyright in test materials**

With the exception of third-party copyright content, the 2024 key stage 2 test materials are Crown copyright. You may re-use them (not including logos) free of charge in any format or medium in accordance with the terms of the Open Government Licence v3.0 which can be found on the National Archives website and accessed via the following link: [www.nationalarchives.gov.uk/doc/open-government-licence](http://www.nationalarchives.gov.uk/doc/open-government-licence). When you use this information under the Open Government Licence v3.0, you should include the following attribution: 'Contains material developed by the Standards and Testing Agency for 2024 national curriculum assessments and licensed under Open Government Licence v3.0' and where possible provide a link to the licence.



**Exception – third-party copyright content in test materials**

Schools and other educational establishments, as defined in the Copyright Designs and Patents Act 1988 (CDPA), may re-use the test materials in their entirety for teaching purposes: <https://www.gov.uk/guidance/exceptions-to-copyright>. However, if not expressly permitted under the CDPA, you must obtain permission from the relevant copyright owners, listed in the '2024 key stage 2 tests copyright report', for re-use of any third-party copyright content which we have identified in the test materials. Alternatively, you should remove the unlicensed third-party copyright content and/or replace it with appropriately licensed material.

If you have any queries regarding these test materials, contact the national curriculum assessments helpline on 0300 303 3013 or email [assessments@education.gov.uk](mailto:assessments@education.gov.uk).

