2018 national curriculum tests

Key stage 2

Mathematics

Paper 2: reasoning

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

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

[BLANK PAGE]

Please do not write on this page.

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

Instructions

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

Questions and answers

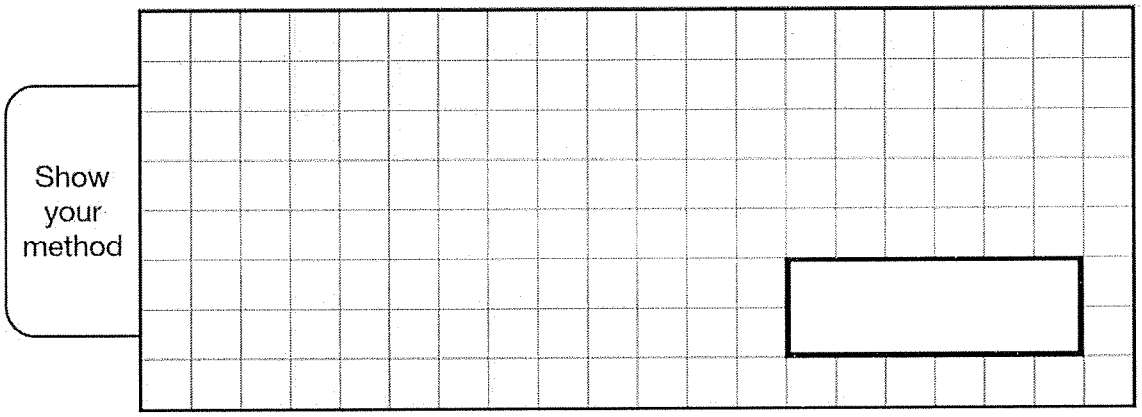
You have **40 minutes** to complete this test.

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:



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

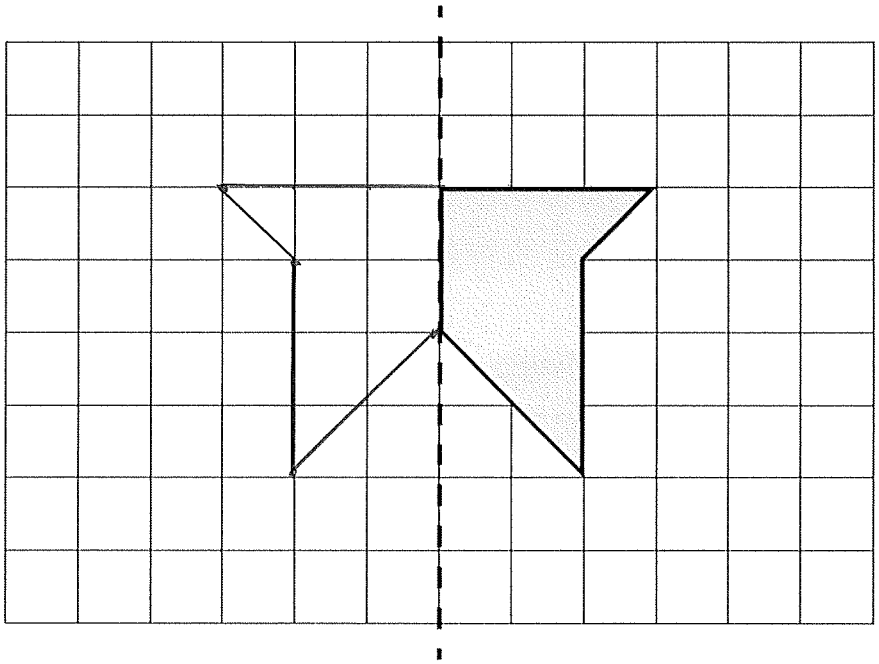
The number under each line at the side of the page tells you the number of marks available for each question.

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

1 Here is a shape on a grid.

Complete the design so that it is symmetrical about the mirror line.

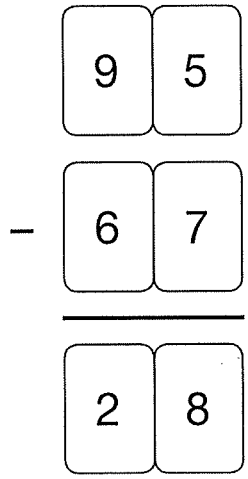
Use a ruler.



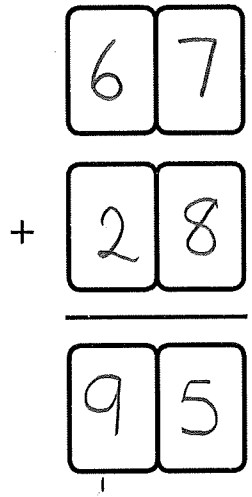
1 mark

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

2 Stefan completes this calculation.



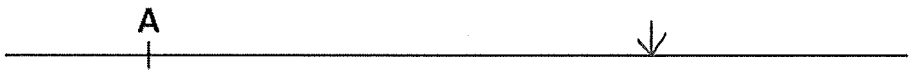
Write an **addition** calculation he could use to check his answer.



1 mark

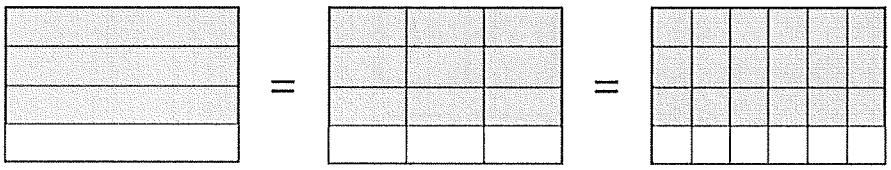
Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

3 On the line below, mark the point that is 6.7 centimetres from A.



1 mark

4 These diagrams show three equivalent fractions.



Write the missing values.

$$\frac{3}{4} = \frac{\times 3 \quad 9}{\times 3 \quad 12} = \frac{\times 6 \quad 18}{\times 6 \quad 24}$$

1 mark

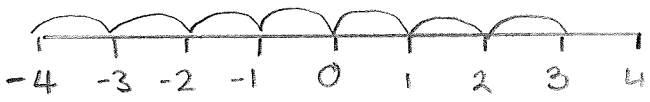
G 0 0 0 7 0 A 0 6 2 4

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

5 Here are the temperatures in four cities at midnight and at midday.

City	Temperature	
	At midnight	At midday
Paris	−4°C	−2°C
Oslo	−13°C	−7°C
Rome	3°C	10°C
Warsaw	−6°C	2°C

At **midnight**, how many degrees colder was Paris than Rome?



7 **degrees**

1 mark

3 − −4 = 7

Which city was 6 degrees colder at midnight than at midday?

Oslo

1 mark

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

6 The numbers in this sequence **decrease** by the same amount each time.

-1000 -1000 -1000

303,604 302,604 301,604 300,604 ...

What is the next number in the sequence?

$$\begin{array}{r} \overset{2}{\cancel{3}}\overset{9}{\cancel{0}}\overset{1}{\cancel{0}}604 \\ -\quad 1000 \\ \hline 299604 \end{array}$$

$\boxed{299604}$

1 mark

7 Tick the **two** numbers that are equivalent to $\frac{1}{4}$

		Tick **two**.
$\frac{1}{4}$	0.25	☑
$\frac{3}{4}$	0.75	☐
$\frac{1}{4}$	$\frac{25}{100}$	☑
$\frac{1}{2}$	0.5	☐
$\frac{2}{10}$	$\frac{2}{5}$	☐

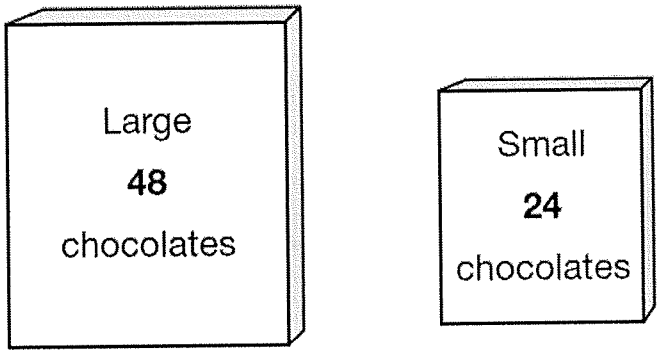
1 mark

G00070A0824

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

8 Ken buys 3 large boxes and 2 small boxes of chocolates.

Each large box has 48 chocolates. Each small box has 24 chocolates.



How many **chocolates** did Ken buy altogether?

Show your method

48 × 3 = 144 (2)

24 × 2 = 48

144 + 48 = 192 (1)

192 **chocolates**

2 marks

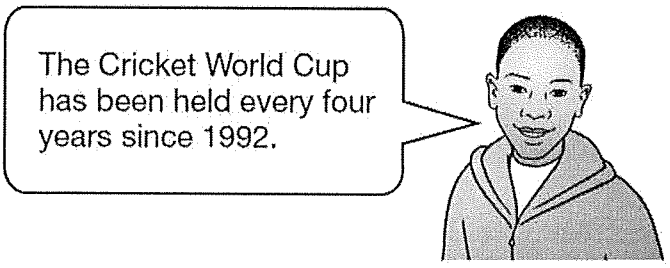
Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

9 The list below shows the years in which the Cricket World Cup was held since 1992:

1992, 1996, 1999, 2003, 2007, 2011, 2015

4 3 4 4 4 4

Adam says,



Adam is **not** correct.

Explain how you know.

The difference between 1996 and 1999 is 3 years not 4 years, so Adam is not correct.

1 mark

G 0 0 0 7 0 A 0 1 0 2 4

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

10

>	=	<

Write the correct symbol in each box to make the statements correct.

11×12 132 [<] 15×10 150

$90 \div 30$ 3 [=] $60 \div 20$ 3

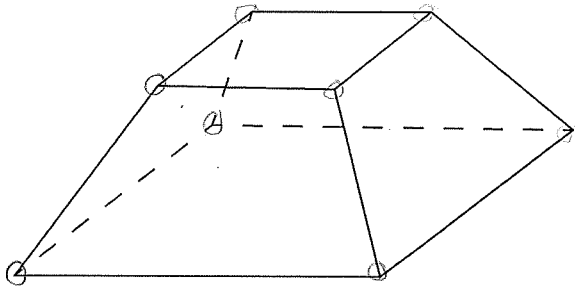
$120 \div 4$ 30 [>] $160 \div 8$ 20

30×8 240 [<] 100×10 1000

2 marks

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

11 Here is a drawing of a 3-D shape.



Complete the table.

Number of faces	Number of vertices	Number of edges
6	8	12

2 marks

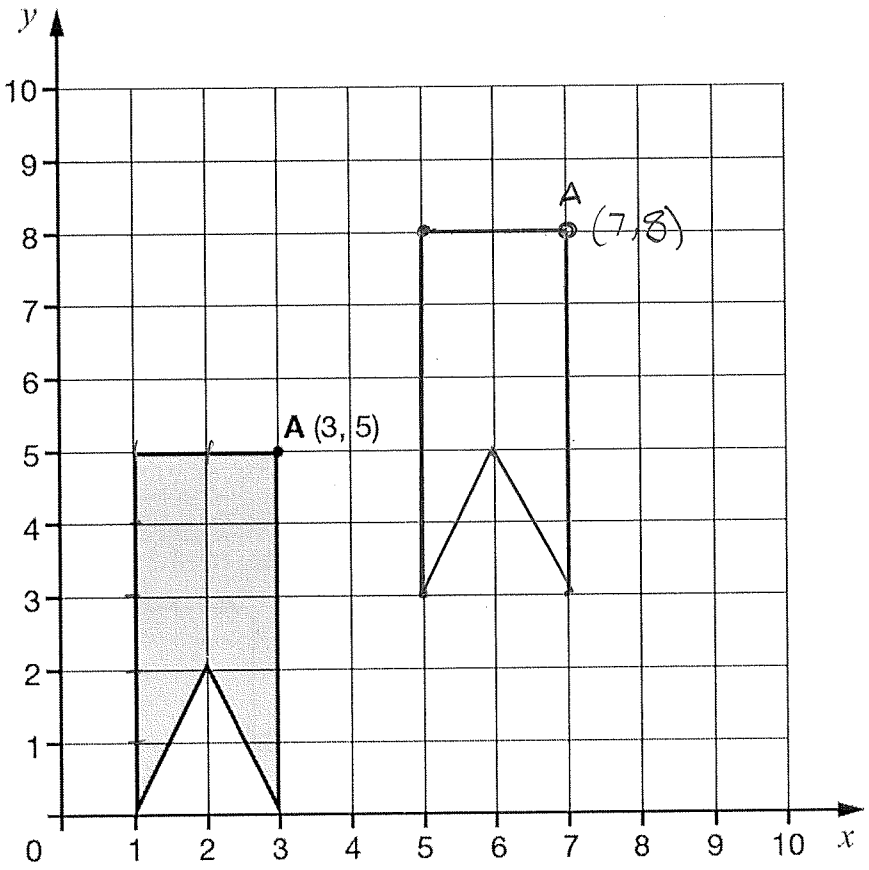
Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

12 Here is a shape on a grid.

The shape is translated so that point **A** moves to (7, 8).

Draw the shape in its new position.

Use a ruler.



1 mark

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

13 Circle the improper fraction that is equivalent to $6\frac{7}{8}$

$\frac{67}{8}$ $\frac{48}{8}$ $\frac{62}{8}$ $\frac{55}{8}$ $\frac{76}{8}$

1 mark

$6 \times 8 = 48$ $48 + 7 = 55$

14 $\frac{6}{5}$ $\frac{3}{5}$ (12) $\frac{3}{4}$ (15)

Write these fractions in order, starting with the **smallest.**

$\frac{3}{5}$ $\frac{3}{4}$ $\frac{6}{5}$

smallest

1 mark

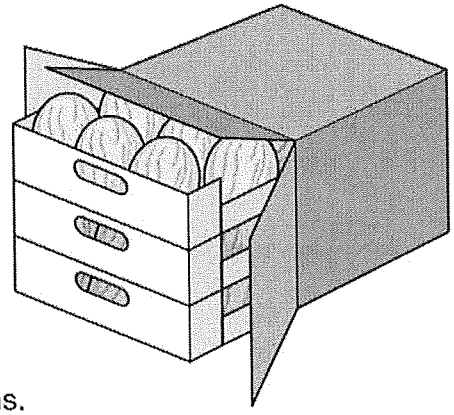
G 0 0 0 7 0 A 0 1 4 2 4

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

15 A box contains trays of melons.

There are 15 melons in a tray.

There are 3 trays in a box.



A supermarket sells **40** boxes of melons.

How many melons does the supermarket sell?

Show your method

15 × 3 = 45

40 × 45 = 200 + 1600 = 1800

1800 melons

2 marks

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

16 Adam wants to use a mental method to calculate 182 – 97

He starts from 182

Here are some methods that Adam could use.

Tick the methods that are **correct.**

add 3 then subtract 90	☐
subtract 100 then add 3	☑
subtract 7 then subtract 90	☑
subtract 3 then subtract 100	☐

2 marks

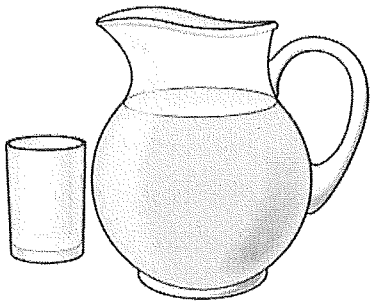
G 0 0 0 7 0 A 0 1 6 2 4

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

17 There are 28 pupils in a class.

The teacher has 8 litres of orange juice.

She pours 225 millilitres of orange juice for every pupil.



How much orange juice is left over?

Show your method

8 Litres = 8000 ml

$$\begin{array}{r} 225 \\ \times\ 28 \\ \hline 1800 \\ +\ 4500 \\ \hline 6300 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 7 \\ 8000 \\ -\ 6300 \\ \hline 1700 \end{array}$$

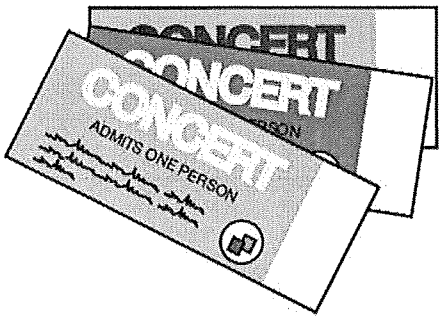
1700 ml

3 marks

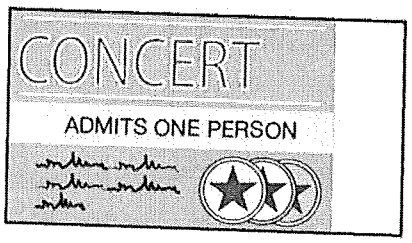
Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

18 Last year, Jacob went to four concerts.

Three of his tickets cost £5 each.



The other ticket cost £7



What was the **mean** cost of the tickets?

Show your method

$3 \times 5 = 15$

$15 + 7 = 22$

5.50

$4 \overline{)22.^{2}00}$

£ 5.50

2 marks

G 0 0 0 7 0 A 0 1 8 2 4

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

19 Layla wants to estimate the answer to this calculation.

$$3\frac{9}{10} - 2\frac{1}{8} + 1\frac{4}{5}$$

4 − 2 + 2

Tick the calculation below that is the best estimate.

Tick **one.**

3 − 2 + 2 ☐

4 − 2 + 1 ☐

4 − 2 + 2 ☑

3 − 2 + 1 ☐

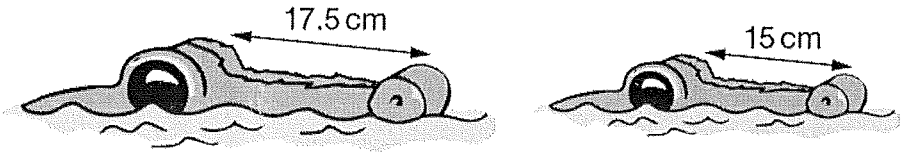
1 mark

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

20 The length of an alligator can be estimated by:

- measuring the distance from its eyes to its nose
- then multiplying that distance by 12

What is the **difference** in the estimated lengths of these two alligators?



Not to scale

Show your method

$$\begin{array}{r} 17.5 \\ \times \quad 12 \\ \hline 35.0 \\ +\,175.0 \\ \hline 210.0 \\ {\scriptstyle 1\ \ 1} \end{array} \qquad \begin{array}{r} 15 \\ \times \quad 12 \\ \hline 30 \\ +\,150 \\ \hline 180 \end{array} \qquad \begin{array}{r} {\scriptstyle 1} \\ 2'10 \\ -\,180 \\ \hline 30 \end{array}$$

30 cm

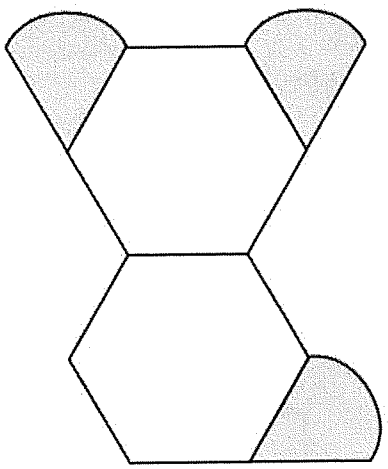
2 marks

G 0 0 0 7 0 A 0 2 0 2 4

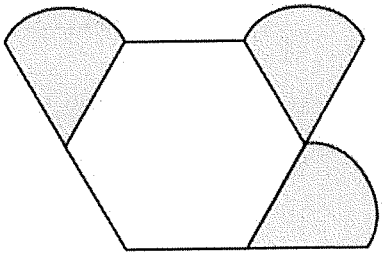
Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

21 Amina is making designs with two different shapes.

She gives each shape a value.



Total value is 147



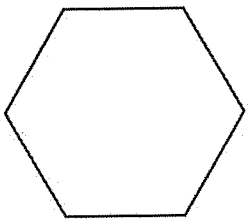
Total value is 111

Calculate the value of each shape.

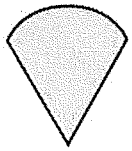
$$\begin{array}{r} 147 \\ -\ 111 \\ \hline 36 \\ \hline \end{array}$$

$$\begin{array}{r} \overset{0}{\cancel{1}}\overset{1}{\cancel{1}}\overset{0}{1} \\ -\ 36 \\ \hline 75 \\ \hline \end{array}$$

$$3\overline{)7\,5}\ \ 25$$



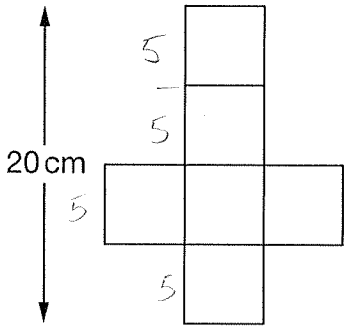
= $\boxed{36}$ 1 mark



= $\boxed{25}$ 1 mark

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

22 This is the net of a cube.



Not actual size

What is the **volume** of the cube?

$5 \times 5 \times 5 = 125$

125 cm^3

1 mark

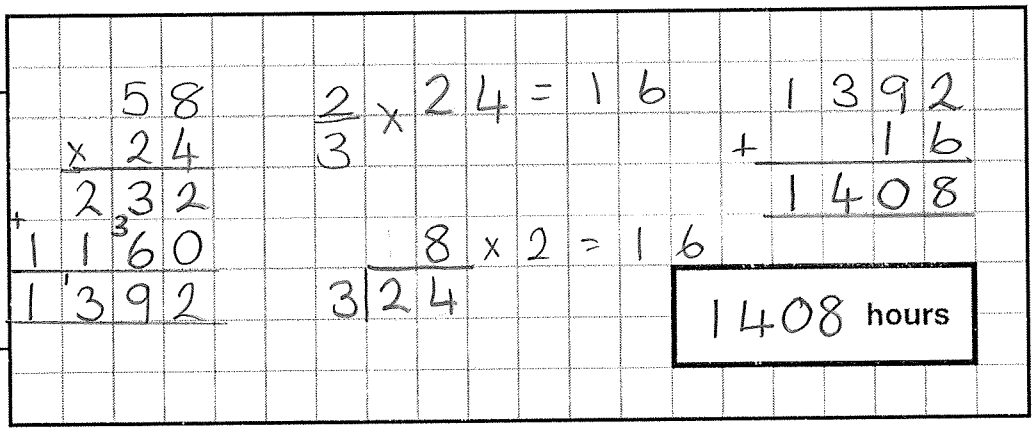
Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

23 The length of a day on Earth is 24 hours.

The length of a day on Mercury is $58\frac{2}{3}$ times the length of a day on Earth.

What is the length of a day on Mercury, in **hours**?

Show your method



2 marks

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk

Standards & Testing Agency

2018 key stage 2 mathematics
Paper 2: reasoning
Print version product code: STA/18/7974/p ISBN: 978-1-78644-627-5
Electronic PDF version product code: STA/18/7974/e ISBN: 978-1-78644-647-3

For more copies
Additional printed copies of this booklet are not available. It can be downloaded from www.gov.uk/government/publications.

© Crown copyright 2018

Re-use of Crown copyright in test materials
Subject to the exceptions listed below, the test materials on this website are Crown copyright and 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. 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 2018 national curriculum assessments and licensed under Open Government Licence v3.0' and where possible provide a link to the licence.

OGL

Exceptions – third-party copyright content in test materials
You must obtain permission from the relevant copyright owners, as listed in the '2018 key stage 2 tests copyright report', for re-use of any third-party copyright content which we have identified in the test materials, as listed below. Alternatively, you should remove the unlicensed third-party copyright content and/or replace it with appropriately licensed material.

Third-party content
These materials contain no third-party copyright content.

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.

G 0 0 0 7 0 A 0 2 4 2 4

Worked Solutions © Exam Ninja 2023 https://www.SATs-Papers.co.uk