

2023 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						



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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:

Show your method

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.**

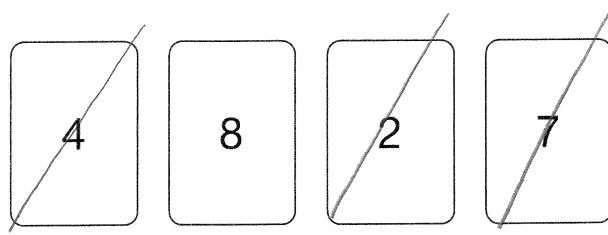
Marks

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



1

Chen has these digit cards.

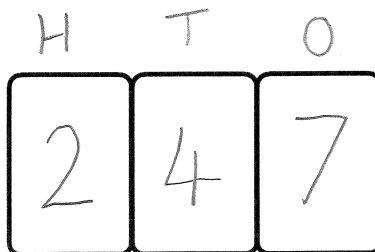


She uses three of the cards to make a **three-digit** number.

Each card can be used only **once**.

Chen puts the **4** in the **tens** place.

Write the **lowest** three-digit number that Chen could make.



1 mark

2

Tick the number **eighty thousand, three hundred and six**.

Tick **one**.

8,306

80,036

80,306

800,306

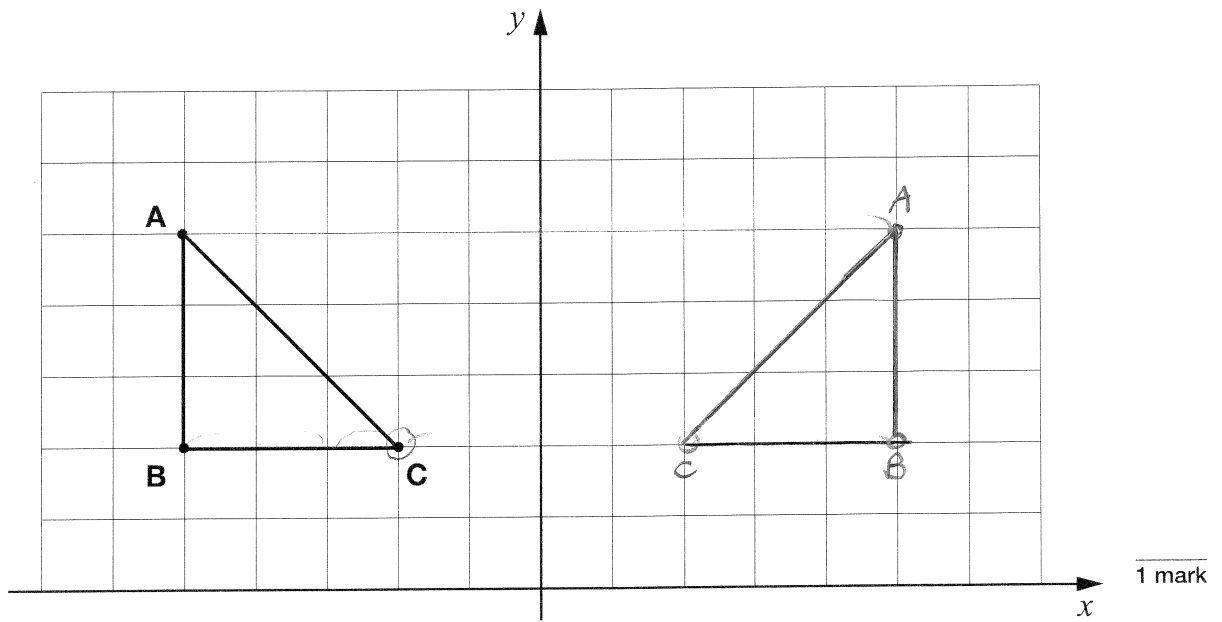
80,300,006

1 mark



3

Amina draws triangle **ABC** on a grid as shown.



She then reflects the triangle in the y -axis.

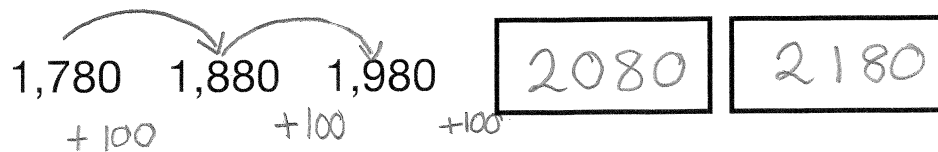
Draw the reflected triangle on the grid.

Use a ruler.

Reflect each point one at a time



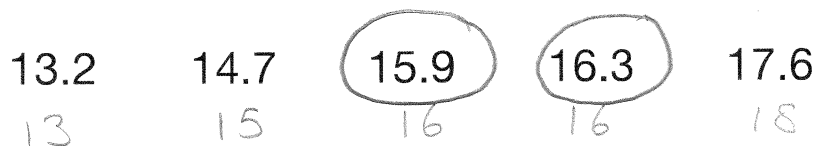
4

Write the next **two** numbers in this sequence.

1 mark

Find the sequence by working out how the numbers change each time e.g. $+100$.

5

Circle the two decimals that round to the **same** whole number.

1 mark



6

Write the missing number to make the calculation correct.

$$1,300,450 = 1,000,000 + \boxed{300\ 000} + 400 + 50$$

1 mark

7

Here is part of a number square.

The other part of the square has been torn off.

$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$
3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
$5\frac{1}{2}$	6	$6\frac{1}{2}$	7	$7\frac{1}{2}$
8		9	$9\frac{1}{2}$	10
$10\frac{1}{2}$			12	$12\frac{1}{2}$

What number was in the bottom-left corner of the number square?

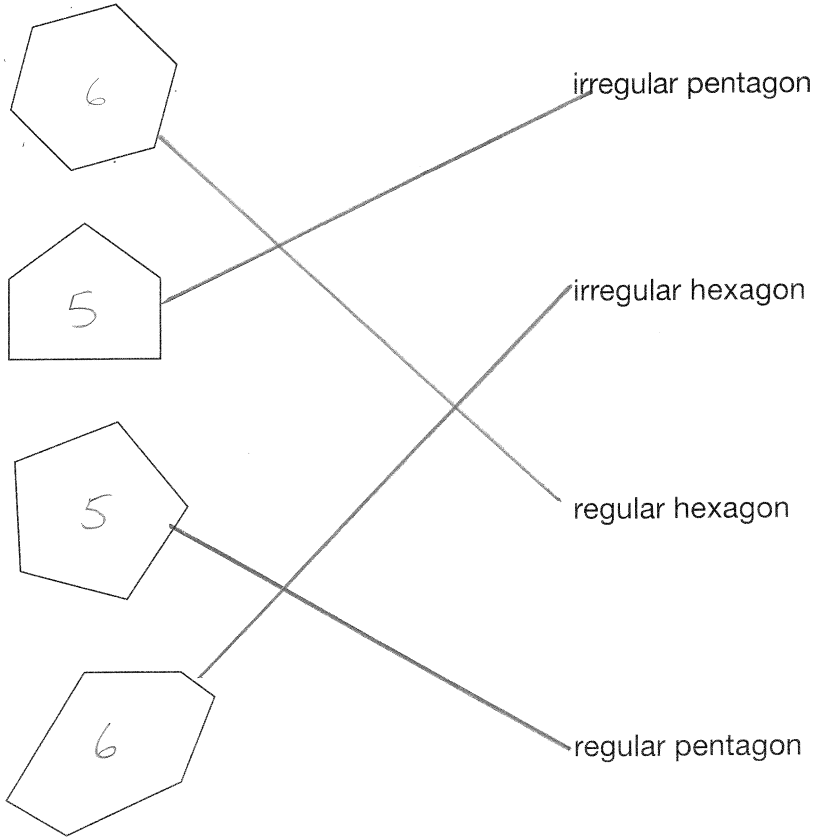
$10\frac{1}{2}$

1 mark



8

Match each shape to the correct name.



1 mark

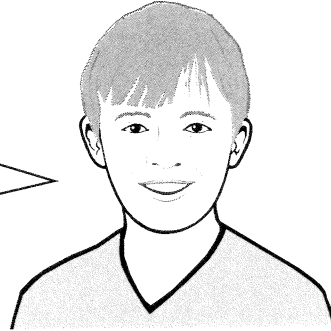
Pentagons have 5 sides.
Hexagons have 6 sides.



9

Jack says,

I multiplied a whole number by 3
My answer was 32



Explain why Jack is **not** correct.

32 is not in the
3 times table so he
cannot be correct

1 mark

3 6 9 12 15 18 21 24 27 30 33 .



10

Write the missing square number to make this addition correct.

$$8^2 + \underline{3}^2 = 73$$

1 mark

$$8 \times 8 = 64$$

$$73 - 64 = 9$$

$$3 \times 3 = 9$$

11

At the start of April, a shop had 15,000 games.

The shop sold:

- 7,918 games in April
- 4,624 games in May.

How many games did the shop have left at the end of May?

Show
your
method

$$\begin{array}{r}
 7918 \\
 + 4624 \\
 \hline
 12542 \\
 \begin{array}{l} \\ \\ \\ \end{array}
 \end{array}
 \quad
 \begin{array}{r}
 499 \\
 15000 \\
 - 12542 \\
 \hline
 02458
 \end{array}$$

2458 games

2 marks

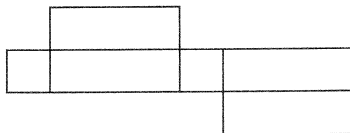
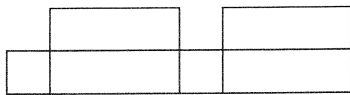
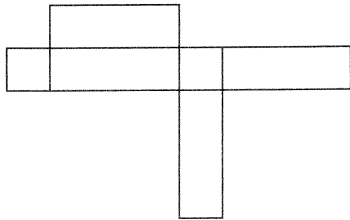
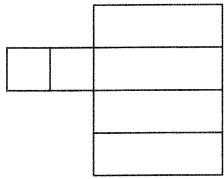


12

This is a drawing of a cuboid.



Tick the nets that could make the cuboid.



2 marks



13

Write the missing number to make this calculation correct.

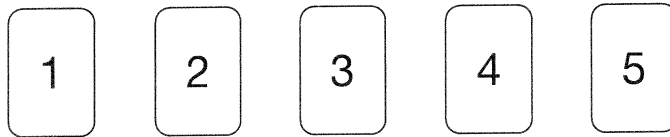
$$754 \times 6 + 754 \times 3 = 754 \times \boxed{9}$$

$\underbrace{\hspace{10em}}_9$
 $754 \times 9 = 754 \times 9$

1 mark

14

Here are five digit cards.

Use two cards to make a fraction **equivalent to 25%**

$$\frac{\boxed{1}}{\boxed{4}}$$

1 mark

Use two cards to make a fraction **equivalent to 0.4**

$$\frac{\boxed{2}}{\boxed{5}}$$

1 mark



15

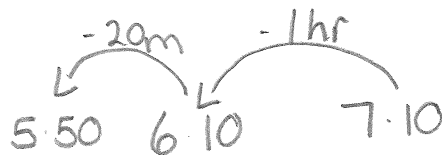
Amina went to a concert one evening.



It took her an hour and twenty minutes to get there from home.

She arrived at ten past seven.

At what time did she leave home?



5:50

1 mark

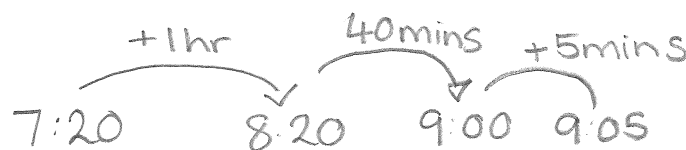
The concert started at 7:20 pm.

It finished at 9:05 pm.

How long did the concert last?

1 hours 45 minutes

1 mark



16

A box of 24 chocolate eggs has a mass of **870 grams**.

The empty box has a mass of **30 grams**.



What is the mass of **one** chocolate egg?

Show
your
method

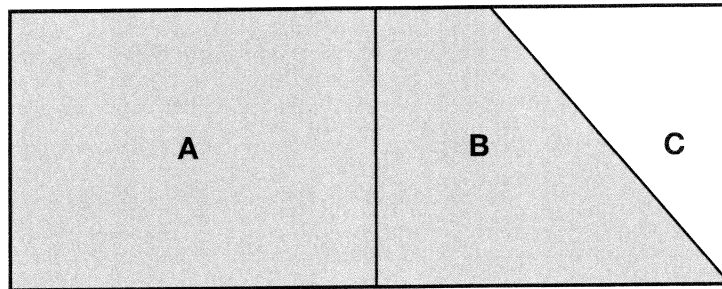
$\begin{array}{r} 870 \\ - 30 \\ \hline 840 \end{array}$	$\begin{array}{r} 35 \\ 24 \overline{)840} \\ \underline{-72} \\ 120 \end{array}$	$\begin{array}{r} 24 \\ 48 \\ -72 \\ 96 \\ 120 \end{array}$
		35 g

2 marks



17

This rectangle is divided into three parts.



Not
to
scale

Part **A** is $\frac{1}{2}$ of the area of the rectangle.

Part **B** is $\frac{1}{3}$ of the area of the rectangle.

Find a common
denominator e.g. 6

What **fraction** of the area of the rectangle is **shaded**?

$$\frac{1}{2} = \frac{3}{6} \quad \frac{1}{3} = \frac{2}{6}$$

$$\frac{1}{6}$$

1 mark

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6} \text{ so } \frac{1}{6} \text{ would be left over.}$$



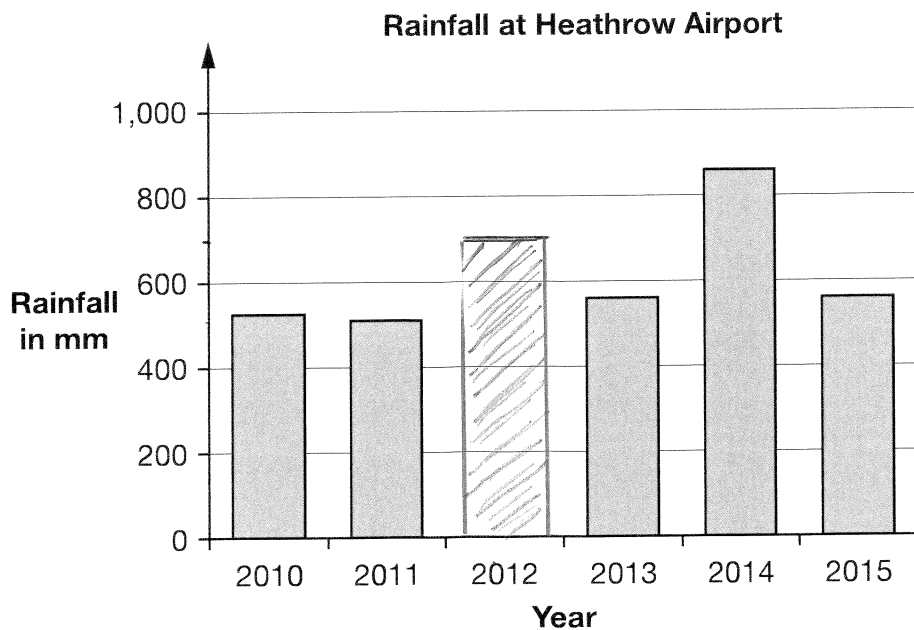
18

This table shows the total rainfall and sunshine each year at Heathrow Airport from 2010 to 2015.

Year	Rainfall in mm	Sunshine in hours
2010	521	1,371
2011	509	1,540
2012	700	1,503
2013	560	1,452
2014	864	1,669
2015	562	1,508

Use this table to complete the graph.

Use a ruler.



1 mark



Use the table to calculate the **mean** hours of sunshine for Heathrow Airport from **2013** to **2015**.

Show your method

$$\begin{array}{r} 1452 \\ 1669 \\ + 1508 \\ \hline 4629 \\ \hline \end{array}$$
$$3 \overline{) 4629} \begin{array}{r} 1543 \\ \underline{34} \\ 12 \\ \underline{12} \\ 9 \\ \underline{9} \\ 0 \end{array}$$

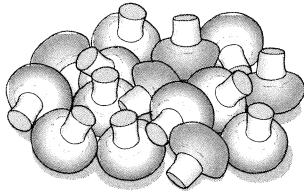
1543 hours

2 marks

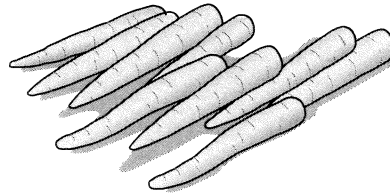


19

These are the prices of some vegetables in a shop.



Mushrooms
£3.20 for 1 kg



Carrots
60p for 1 kg

Layla buys **500 grams** of mushrooms and $1\frac{1}{4}$ kg of carrots.

She pays with a **£5** note.

How much change does Layla get?

Show your method

$500\text{ g} = \frac{1}{2}\text{ a kg}$	$\frac{1}{4}\text{ of } 60\text{p} = 15\text{p}$
$\begin{array}{r} 1.60 \\ 2 \overline{) 3.20} \\ \underline{2.00} \\ 1.20 \\ \underline{1.20} \\ 0.00 \end{array}$	$\begin{array}{r} 1.60 \\ + \quad .75 \\ \hline 2.35 \end{array}$
$\begin{array}{r} 60 \\ + 15 \\ \hline 75 \end{array}$	$\begin{array}{r} 4 \quad 9 \\ \cancel{5}. \cancel{0}0 \\ - 2.35 \\ \hline 2.65 \end{array}$
	£ 2.65

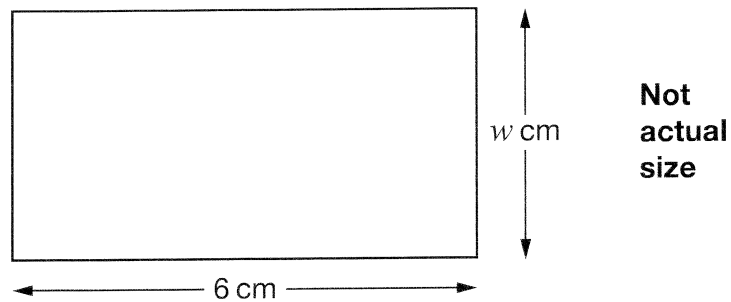
2 marks



20

The length of this rectangle is 6 cm.

The width is w cm.



Circle **all** the methods below that can be used to work out the **perimeter** of the rectangle.

$$w \times 6$$

$$w \times 2 + 12$$

$$2 \times (w + 6)$$

$$6 + w + 6 + w$$

2 marks

$$P = 2 \times 6 + 2 \times w$$



21

There are 25 classes in a school.

Each class has 34 pupils.

62% of all the pupils play a sport after school.

What number of pupils do not play a sport?

Show your method

$\begin{array}{r} 34 \\ \times 25 \\ \hline 170 \\ + 680 \\ \hline 850 \end{array}$	$\begin{array}{r} 4 \\ 850 \\ - 527 \\ \hline 323 \end{array}$
$\begin{array}{l} 10\% \text{ of } 850 = 85 \\ 1\% \text{ of } 850 = 8.5 \end{array}$	
$\begin{array}{r} 85 \\ \times 6 \\ \hline 510 \\ \hline 527.0 \end{array}$	$\begin{array}{r} 510.0 \\ + 8.5 \\ \hline 527.0 \end{array}$
	323 pupils

3 marks



22

Megan uses these number machines to calculate how many diagonals different shapes have.

	number of vertices			number of diagonals
triangle	3	$\times 0$	$\div 2$	0
quadrilateral	4	$\times 1$	$\div 2$	2
pentagon	5	$\times 2$	$\div 2$	5
	6	$\times 3$	$\div 2$	9
	7	$\times 4$	$\div 2$	14

Complete the number machine for the **octagon**.

octagon	8	$\times 5$	$\div 2$	20
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1 mark



23Write the missing **decimals**.

One has been done for you.

a	b	$\frac{a}{b}$
1	4	0.25
3	20	0.15
5	8	0.625

2 marks

$$\frac{3}{20} \rightarrow \frac{15}{100}$$

$$\frac{1}{8} = 0.125$$



[END OF TEST]

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