2017 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						

F 0 0 0 8 0 A 0 1 2 4

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Instructions

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

Questions and answers

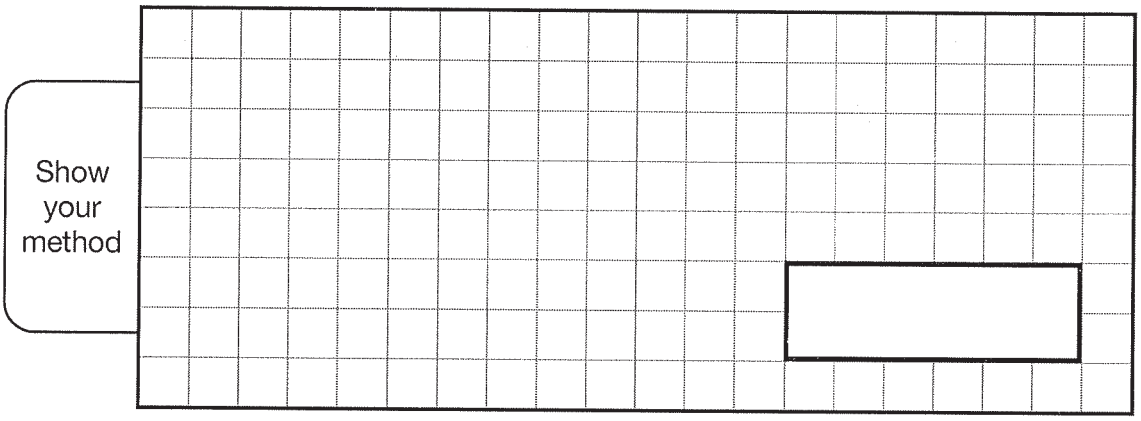
You have **40 minutes** to complete this test.

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:



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 maximum number of marks for each question.

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1 Write the missing number to make this **division** correct.

$75 \div \boxed{10} = 7.5$

1 mark

2 A group of friends earns £80 by washing cars.

They share the money **equally**.

They get £16 each.

How many friends are in the group?

16, 64 4
32 2 80 5
48 3

5

1 mark

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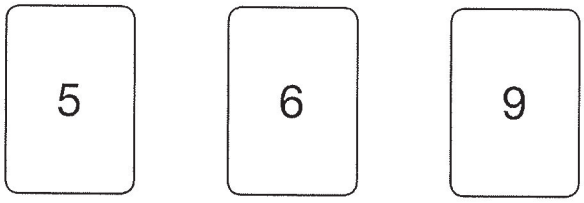
3 Chen uses these digit cards.

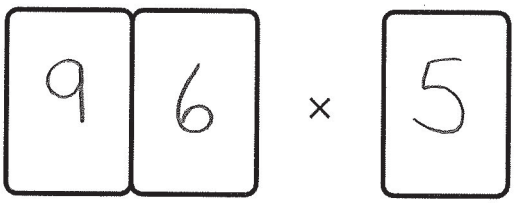


She makes a 2-digit number and a 1-digit number.

She multiplies them together.

Her answer is a **multiple of 10**

What could Chen's multiplication be?



$$\begin{array}{r} 96 \\ \times\ \ 5 \\ \hline 480 \\ {\scriptstyle 3} \end{array}$$

1 mark

Multiplying an even number by 5 will give a product that is a multiple of 10.

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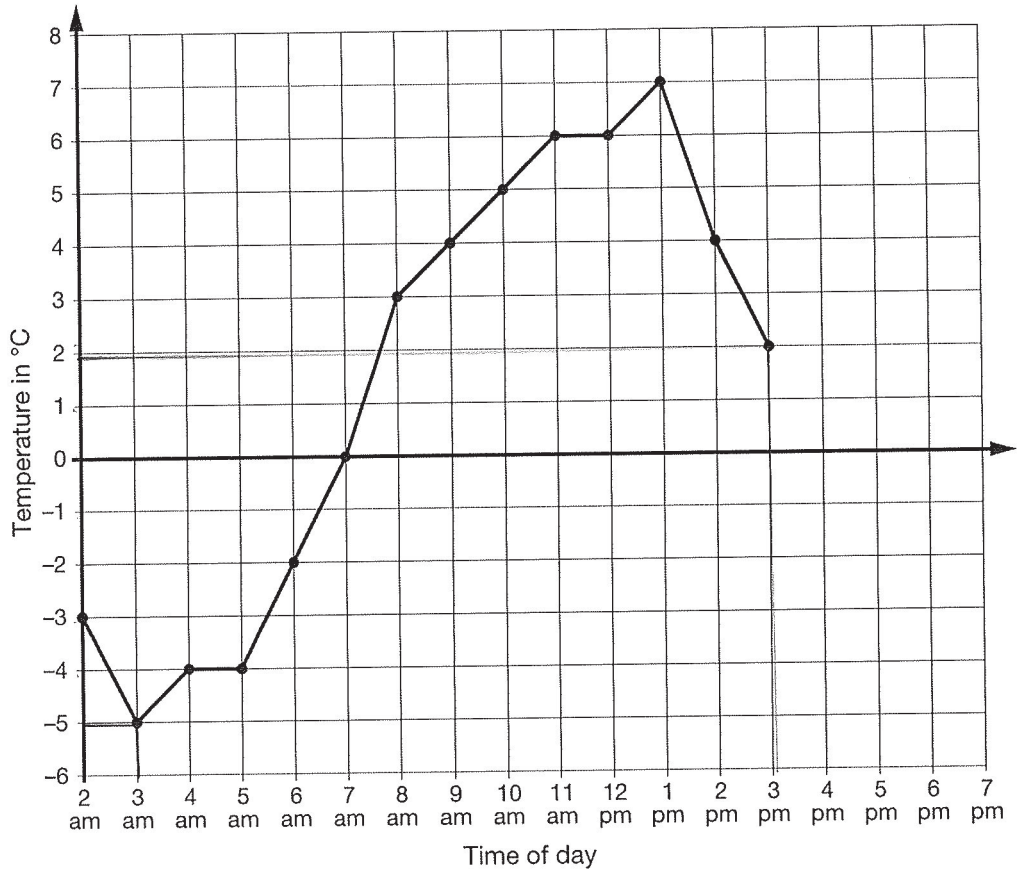
4 This graph shows the temperature in °C from 2 am to 3 pm on a cold day.



How many degrees **warmer** was it at 3 pm than at 3 am?

7 °C

1 mark

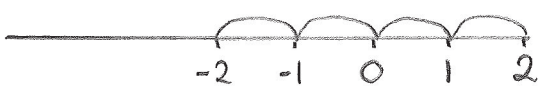
At 6 pm the temperature was 4 degrees lower than at 3 pm.

What was the temperature at 6 pm?

2 − 4 = −2

−2 °C

1 mark



F 0 0 0 8 0 A 0 6 2 4

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5 The children at Farmfield School are collecting money for charity.

Their target is to collect £360

So far they have collected £57.73

How much **more** money do they need to reach their target?

$$\begin{array}{r} {}^{5}\cancel{3}{}^{9}\cancel{6}{}^{1}\cancel{0}.{}^{1}\cancel{0}{}^{9}0 \\ -\quad 57.73 \\ \hline 302.27 \end{array}$$

£ 302.27

1 mark

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6 William wants to travel to Paris by train.

He needs to arrive in Paris by **5:30 pm**.

Circle the **latest time** that William can leave London.

Leaves London	Arrives Paris
12:01	15:22
12:25	15:56
13:31	16:53
14:01	17:26
14:31	17:53
15:31	18:53
16:01	19:20

* Too late

1 mark

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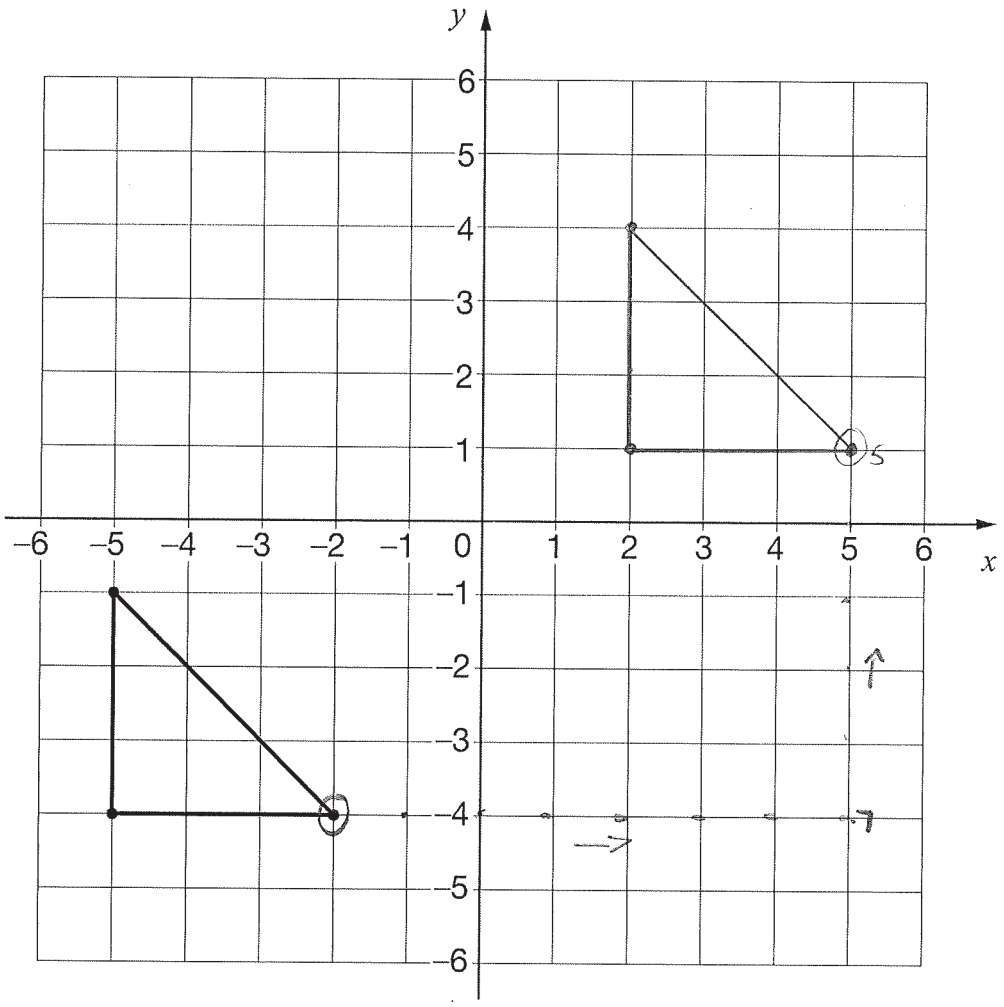
7 Here is a triangle drawn on a coordinate grid.



1 mark

The triangle is translated **7 right** and **5 up**.

Draw the triangle in its new position.

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8 Write three factors of 30 that are **not** factors of 15

2	10	6

2 marks

Factors of 30
1, 30, 2, 15
6, 5, 10, 3

Factors of 15
1, 15, 3, 5

9 Here is the morning timetable for Chen's class this week.

Time	Mon	Tue	Wed	Thu	Fri
9:00 am–10:30 am	Maths	English 1·5	Maths	English 1·5	Maths
10:30 am–11:00 am	Break	Break	Break	Break	Break
11:00 am–12:00 pm	English 1	Maths	Science	Maths	English 1

What is the **total** number of hours for **English** on this timetable?

$$\begin{array}{r} 1 \cdot 5 \\ +\ 1 \cdot 5 \\ 1 \cdot 0 \\ 1 \cdot 0 \\ \hline 5 \cdot 0 \\ \hline 1 \end{array}$$

5 **hours**

1 mark

F 0 0 0 8 0 A 0 1 0 2 4

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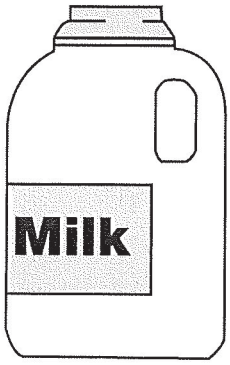
10 A bottle contains 568 millilitres of milk.

Jack pours out **half a litre**.



How much milk is left?

$$\begin{array}{r} 568 \\ -\ 500 \\ \hline 68 \end{array}$$

68ml

1 mark

11 A bicycle wheel has a diameter of 64 cm.

What is the **radius** of the bicycle wheel?

$$2\overline{)64} = 32$$

32 cm

1 mark

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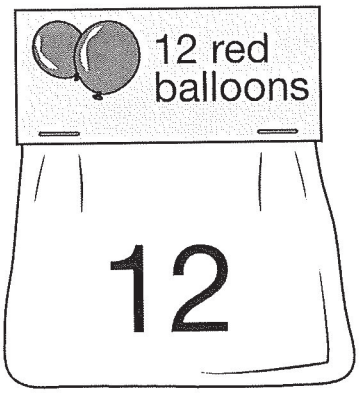
12



Adam buys **6** bags of white balloons.

Chen buys **3** bags of red balloons.

Adam says,

'I have four times as many balloons as Chen.'

Explain why Adam is correct.

$$\begin{array}{r} 24 \\ \times\ 6 \\ \hline 144 \end{array} \qquad \begin{array}{r} 12 \\ \times\ 3 \\ \hline 36 \end{array} \qquad 4\overline{)144} = 36$$

3 times 12 is 36 and 144 ÷ 4 is 36.

1 mark

F 0 0 0 8 0 A 0 1 2 2 4

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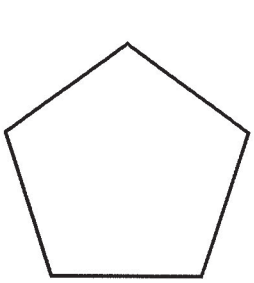
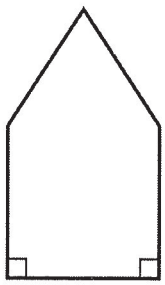
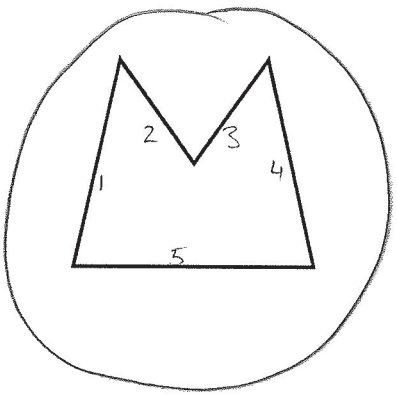
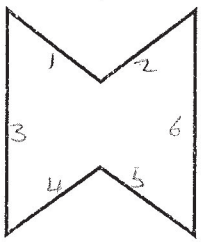
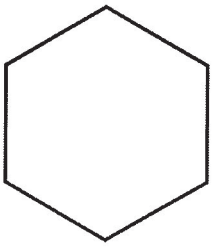
13 Circle the **pentagon** with exactly **four acute angles.**











1 mark

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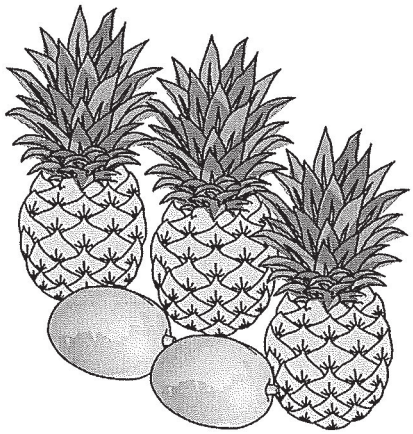
14 3 pineapples cost the same as 2 mangoes.

One mango costs £1.35



How much does **one** pineapple cost?

Show your method

$$\begin{array}{r} 1.35 \\ \times \quad 2 \\ \hline 2.70 \end{array}$$

$$3 \overline{)2.70} \quad 0.90$$

£0.90

2 marks

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15 Look at the letters below.

Circle the letter below that has both parallel **and** perpendicular lines.

A C E L Z

1 mark

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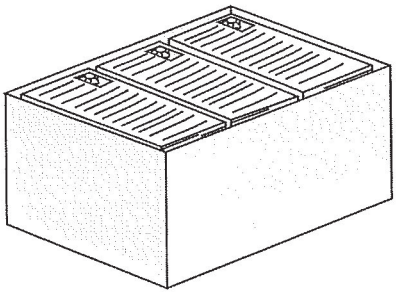
16



There are 2,400 leaflets in a box.

William and Ally take 450 leaflets each.

Adam and Chen share the rest of the leaflets equally.

How many leaflets does Adam get?

Show your method

$$\begin{array}{r} \overset{1}{\cancel{2}}\,{}^{1}400 \\ -\ 900 \\ \hline 1500 \end{array} \qquad \begin{array}{r} 750 \\ 2\overline{)1500} \end{array}$$

$2 \times 450 = 900$

$\boxed{750}$

2 marks

F 0 0 0 8 0 A 0 1 6 2 4

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17 In each box, circle the number that is **greater.**

$1\frac{1}{2}$	1.2

1.5

$1\frac{1}{4}$	1.3

1.25

$1\frac{5}{100}$	1.4

1.05

$1\frac{3}{5}$	1.5

1.6

2 marks

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18 A **square** number and a **prime** number have a total of 22

What are the two numbers?

9	+	13	=	22
square number		prime number		

1 mark

4, (9), 16

1, 3, 5
7, 11, (13)

19 Dev thinks of a **whole** number.

He multiplies it by 4

He rounds his answer to the nearest 10

The result is 50

Write **all** the possible numbers that Dev could have started with.

12 or 13

2 marks

4_1 24_6 44_{11}
8_2 28_7 (48_{12})
12_3 32_8 (52_{13})
16_4 36_9
20_5 40_{10}

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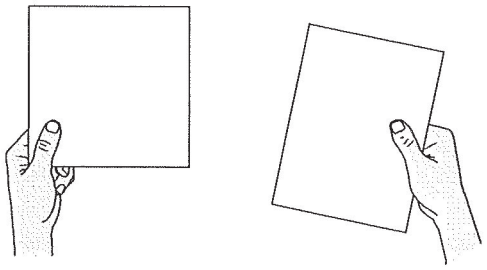
20



A square tile measures 20 cm by 20 cm.

A rectangular tile is 3 cm **longer** and 2 cm **narrower** than the square tile.

What is the **difference in area** between the two tiles?

Show your method

$20 \times 20 = 400$

$23 \times 18 = 184 + 230 = 414$

$414 - 400 = 14$

14 cm²

3 marks

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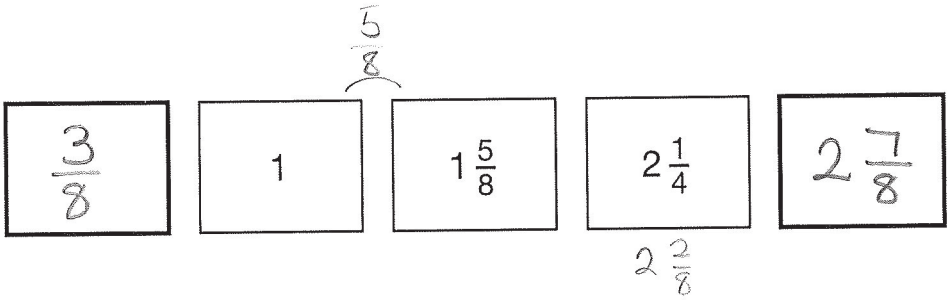
21 The numbers in this sequence increase by the same amount each time.

Write the missing numbers.



1 mark

1 mark

F 0 0 0 8 0 A 0 2 0 2 4

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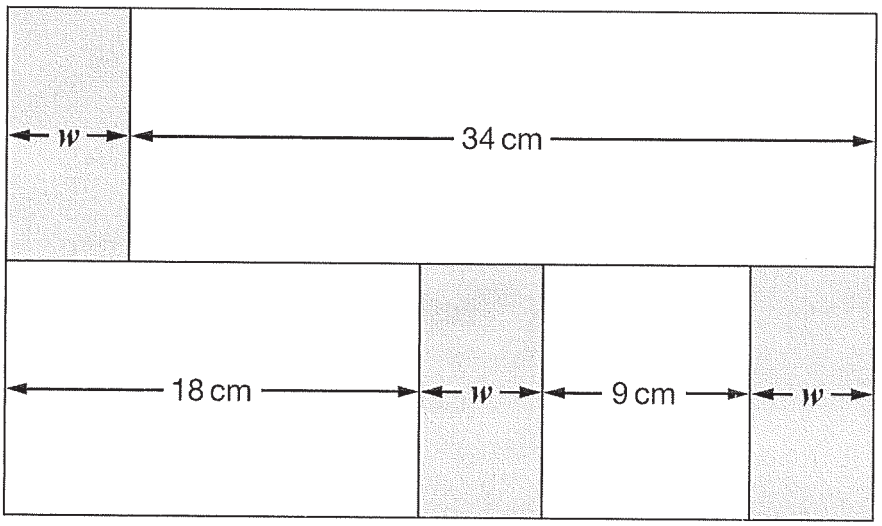
22 In this diagram, the shaded rectangles are all of equal width (w).



Not to scale

Calculate the width (w) of one shaded rectangle.

Show your method

$18 + 9 = 27$

$34 - 27 = 7$

7 cm

2 marks

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23 Here is a pattern of number pairs.

a	b	
1	9	$10 \times 1 - 1 = 9$
2	19	$10 \times 2 - 1 = 19$
3	29	$10 \times 3 - 1 = 29$
4	39	$10 \times 4 - 1 = 39$

Complete the **rule** for the number pattern.

$b =$ [10] $\times a -$ [1]

1 mark

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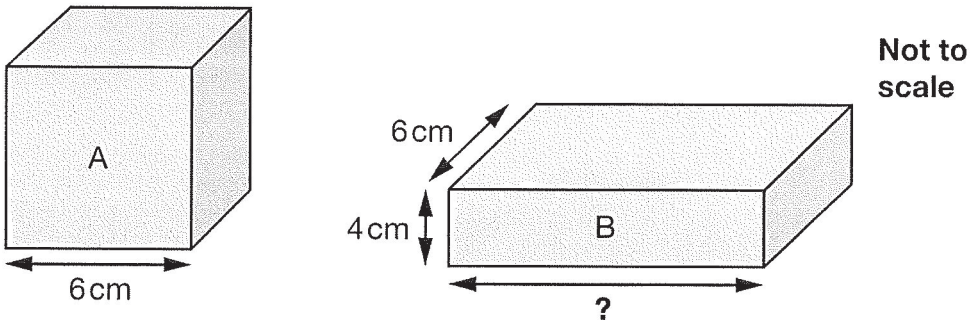
24 Cube A and cuboid B have the same volume.



Calculate the missing length on cuboid B.

Show your method

$6 \times 6 \times 6 = 216$

$36 \times 6 = 216$

54

$4 \overline{)216}$

9

$6 \overline{)54}$

9 cm

2 marks

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