

**Pack B**

# Paper 3: reasoning

**Worked answers**



1

Ben is making a sequence, starting with 300.

He subtracts 95 each time.

Write the missing numbers in the boxes.

300

205

110



1

Ben is making a sequence, starting with 300.

He subtracts 95 each time.

Write the missing numbers in the boxes.

300

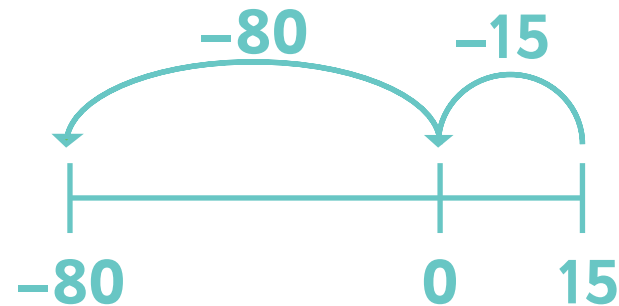
205

110

15

-80

$$\begin{array}{r} \overset{0}{\cancel{1}} \overset{10}{\cancel{1}} \overset{1}{\cancel{0}} \\ - \quad \quad 95 \\ \hline 15 \end{array}$$



2

Order the numbers starting with the largest. Match each number with its order.

1,023,201

1st largest

1,203,001

2nd

1,023,021

3rd

1,203,012

4th smallest



2

Order the numbers starting with the largest. Match each number with its order.

Look at each digit individually and compare.

1,023,201

3rd

1,203,001

2nd

1,023,021

4th

1,203,012

largest

1st largest

2nd

3rd

4th smallest



3

Round **218.45**

to one decimal place

to the nearest whole number

to the nearest 10



3

Round **218.45**

**218.45** to one decimal place

Look at the hundredths digit.

The tenths digit rounds up.

**218.5**

**218.45** to the nearest whole number

Look at the tenths digit.

The ones digit rounds the same.

**218**

**218.45** to the nearest 10

Look at the ones digit.

The tens digit rounds up.

**220**



4

Write the number that is **100 times greater** than four hundred and eighteen.





4

Write the number that is **100 times greater** than four hundred and eighteen.

418

**100 times greater means my digits  
will move two places to the left.**

  
418  
41800

41,800



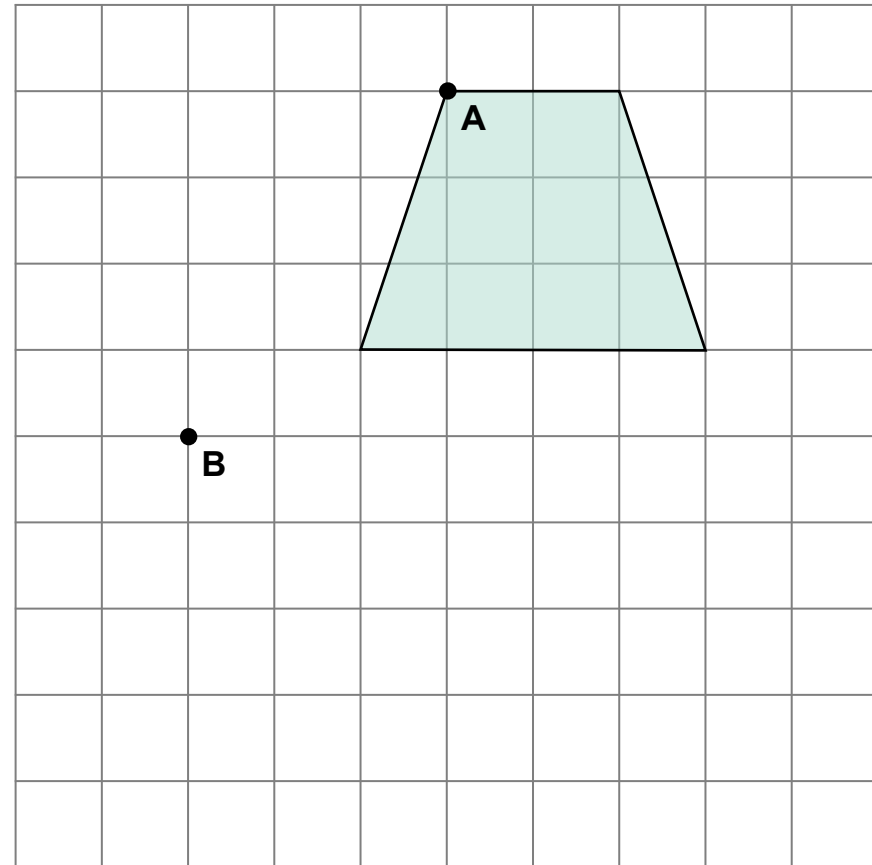
5

Here is a shape on a grid.

The shape is translated so that point A moves to point B.

Draw the shape in its new position.

Use a ruler.



5

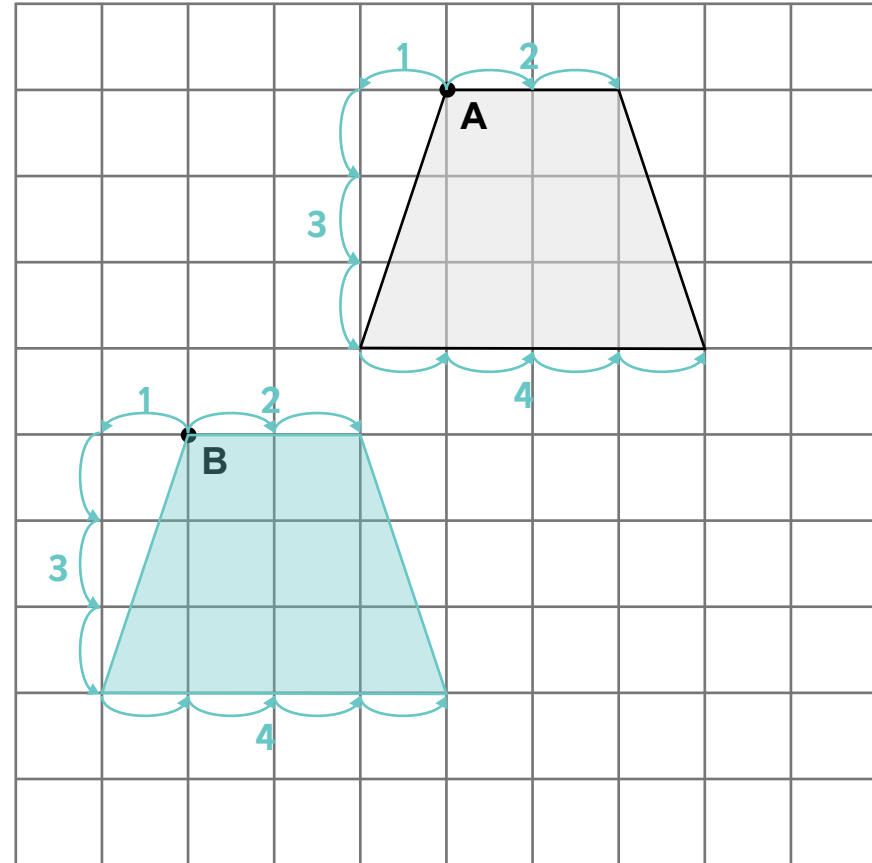
Here is a shape on a grid.

The shape is translated so that point A moves to point B.

Draw the shape in its new position.

Use a ruler.

Count squares to help make sure your translation shape looks the same.



6

Match each fraction to its equivalent simplified fraction.

$$\frac{15}{25}$$

$$\frac{6}{20}$$

$$\frac{9}{12}$$

$$\frac{12}{24}$$

$$\frac{6}{16}$$

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

$$\frac{3}{5}$$

$$\frac{3}{10}$$

$$\frac{3}{8}$$

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



6

Match each fraction to its equivalent simplified fraction.

Simplify the fractions

$$\frac{3}{5} \quad \frac{15}{25}$$

$\div 5$

$$\frac{3}{10} \quad \frac{6}{20}$$

$\div 2$

$$\frac{3}{4} \quad \frac{9}{12}$$

$\div 3$

$$\frac{1}{2} \quad \frac{12}{24}$$

$\div 12$

$$\frac{3}{8} \quad \frac{6}{16}$$

$\div 2$

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

$$\frac{3}{5}$$

$$\frac{3}{10}$$

$$\frac{3}{8}$$

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



7

Write the missing number to make this **addition** correct.

200,000 +

+ 60 = 270,060



7

Write the missing number to make this **addition** correct.

$$200,000 + 70,000 + 60 = 270,060$$

✓  
270,060  
✓



8

Three different single-digit numbers multiply to make 105.

Find the missing numbers.

**x**

**x**

**=**

**105**





8

Three different single-digit numbers multiply to make 105.

Find the missing numbers.

$$\boxed{5} \times \boxed{3} \times \boxed{7} = \boxed{105}$$

$$\begin{array}{r} 21 \\ 5 \overline{) 105} \end{array}$$

$$3 \times 7 = 21$$



9

Find a **square** number and a **cube** number that have a sum of 100.

$$\begin{array}{ccccc} \boxed{\phantom{000}} & + & \boxed{\phantom{000}} & = & \boxed{100} \\ \text{square number} & & \text{cube number} & & \end{array}$$



9

Find a square number and a cube number that have a sum of 100.

36

+

64

=

100

square number

cube number

Square numbers:

1

36

4

49

9

64

16

81

25

Cube numbers:

1

8

27

64



10

James is looking at the numbers below.

211

198

204

187

Which number is **closest** to 200?

Which number is **furthest** from 200?



10

James is looking at the numbers below.

$$211 - 200 = 11$$

**211**

11 away  
from 200

$$200 - 198 = 2$$

**198**

2 away  
from 200

$$204 - 200 = 4$$

**204**

4 away  
from 200

$$200 - 187 = 13$$

**187**

13 away  
from 200

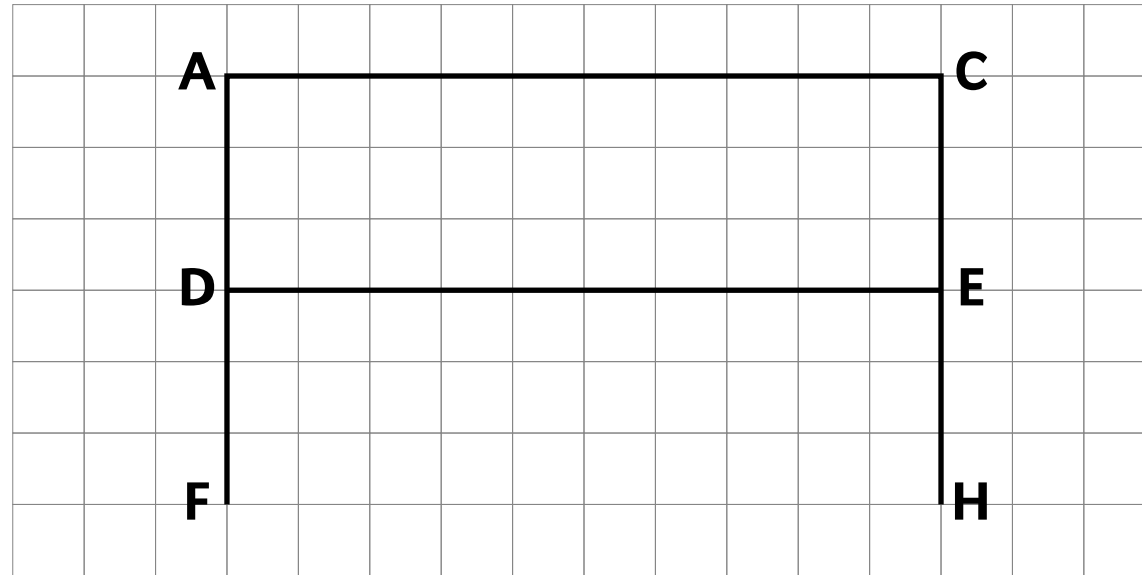
Which number is **closest** to 200?

198

Which number is **furthest** from 200?

187





Tick all the correct statements.

AC is parallel to DE

☐

AF is perpendicular to CH

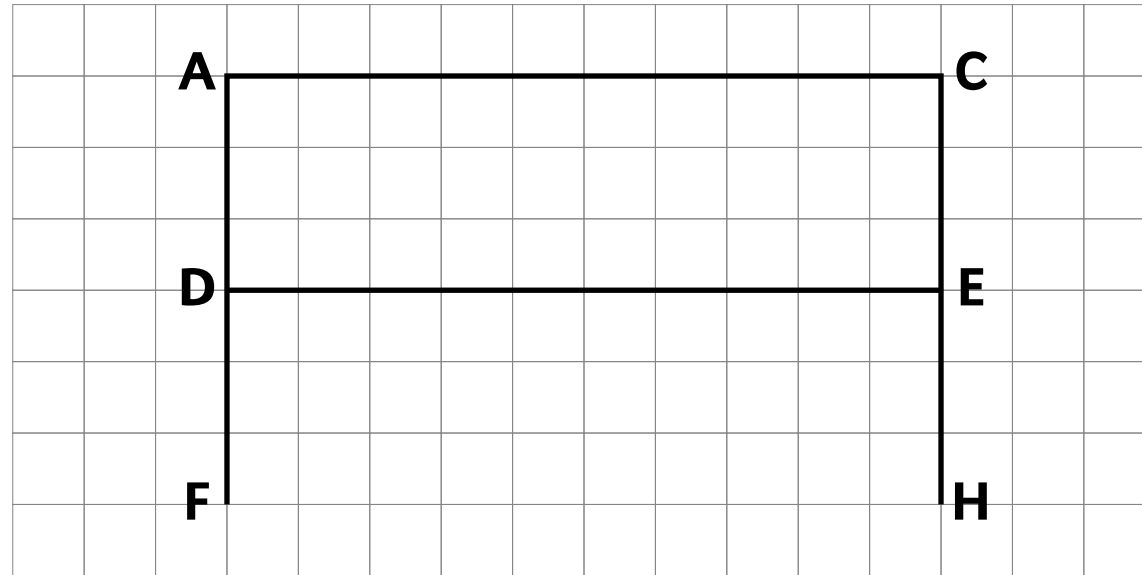
☐

DE is parallel to AF

☐

CH is perpendicular to DE

☐



parallel: //

perpendicular: 

Tick all the correct statements.

AC is parallel to DE



AF is perpendicular to CH



DE is parallel to AF



CH is perpendicular to DE



12

Shen buys 4 large trays of cupcakes and 6 small trays of cupcakes.

Each large tray has 22 cupcakes and each small tray has 12 cupcakes.

How many **cupcakes** does Shen buy?





12

Shen buys 4 large trays of cupcakes and 6 small trays of cupcakes.

Each large tray has 22 cupcakes and each small tray has 12 cupcakes.

How many **cupcakes** does Shen buy?

Large trays:

4 trays, 22 cupcakes

$4 \times 22 = 88$  cupcakes

Small trays:

6 trays, 12 cupcakes

$6 \times 12 = 72$  cupcakes

		8	8
+		7	2
	1	6	0
		1	

160



13

Fill in the missing numbers.

$$\boxed{\phantom{000}} - 211 = 87$$

$$22 \times \boxed{\phantom{000}} = 352$$



13

Fill in the missing numbers.

Use the inverse to find the missing numbers.

$$\begin{array}{r} 211 \\ + 87 \\ \hline 298 \end{array}$$

298

-

211

=

87

22

x

16

=

352

$$\begin{array}{r} 016 \\ 22 \overline{) 352} \\ - 22 \\ \hline 132 \\ - 132 \\ \hline 0 \end{array}$$

OR

$$2 \overline{) 176}$$

$$11 \overline{) 176}$$

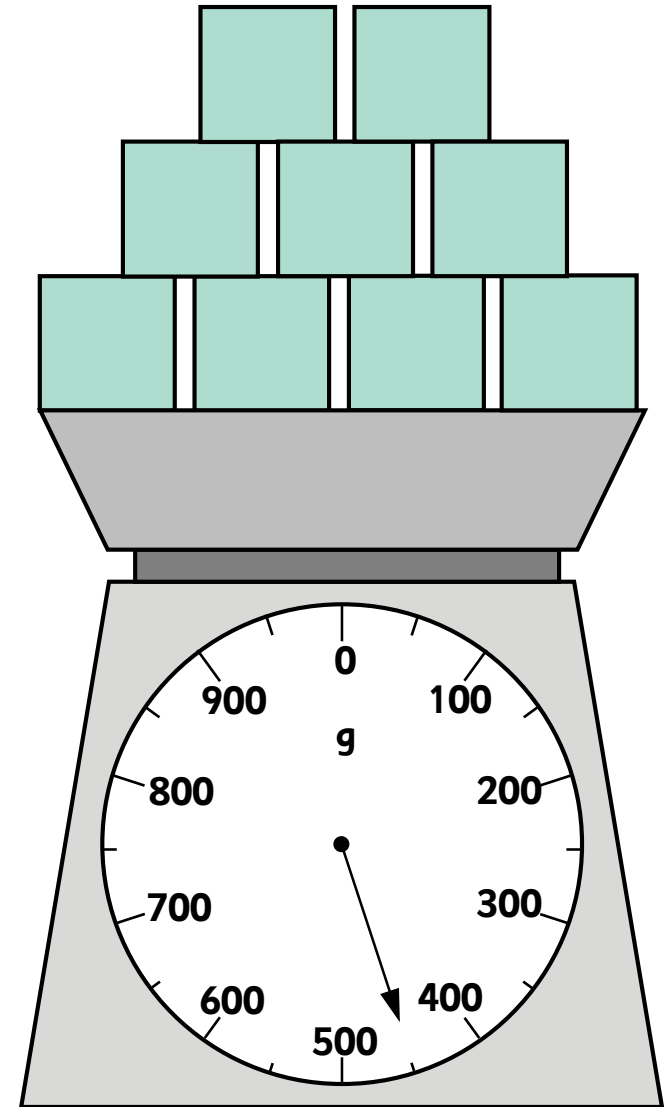


14

Sarah has built a tower out of blocks.  
Each block has the same mass.  
She places her tower on the scales.  
She removes one block.

What does the scale read now?

g



14

Sarah has built a tower out of blocks.  
Each block has the same mass.  
She places her tower on the scales.  
She removes one block.

What does the scale read now?

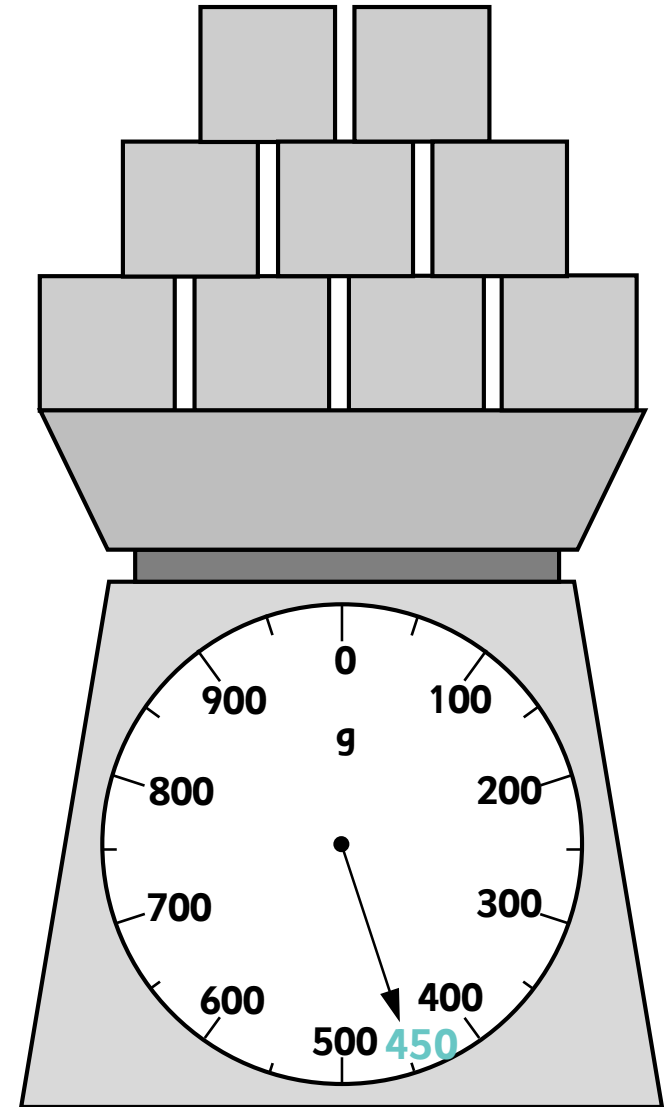
The measurement on the scale is 450 g.  
There are 9 blocks on the scale.

$$450 \div 9 = 50 \text{ g}$$

$$\text{So, 1 block} = 50 \text{ g}$$

$$\begin{aligned} \text{Remove 1 block:} \\ 450 - 50 = 400 \text{ g} \end{aligned}$$

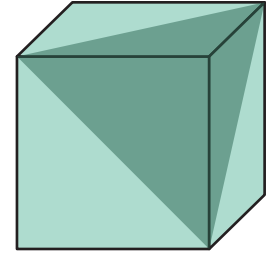
400 g



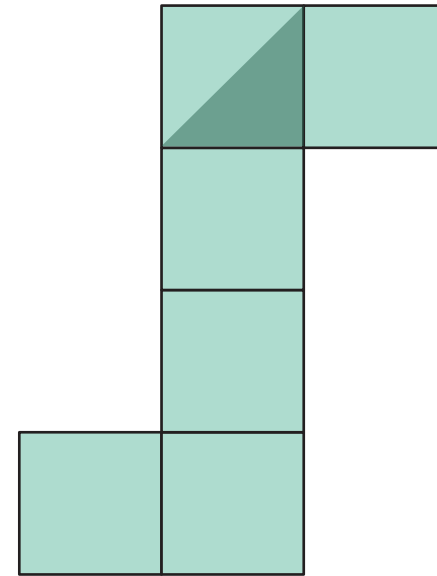
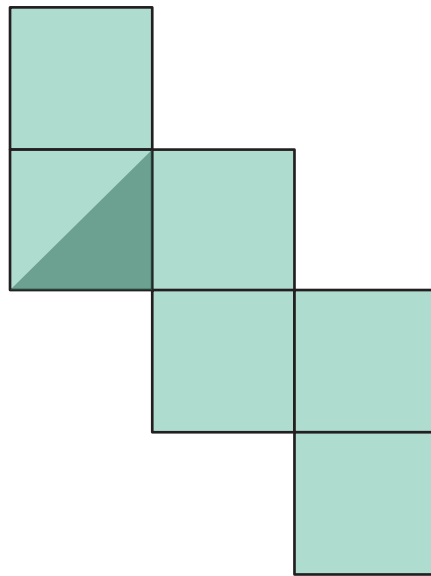
15

Here is a cube.

Three faces of a cube are shaded diagonally, with half of each face shaded. Below are two nets of the cube. Part of each net has been shaded.



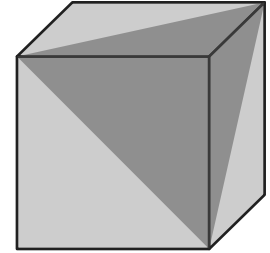
Complete the missing shading.



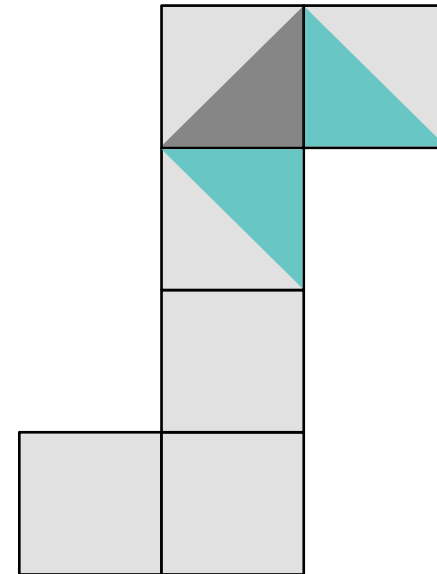
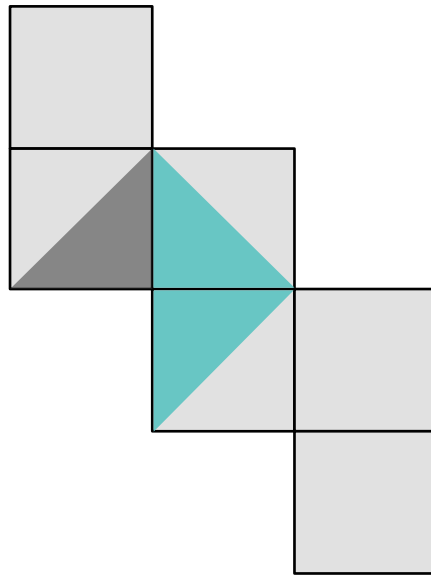
15

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Three faces of a cube are shaded diagonally, with half of each face shaded.  
Below are two nets of the cube. Part of each net has been shaded.

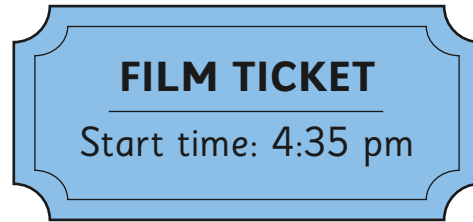


Complete the missing shading.



16

Abdul is going to see a film.



It takes Abdul 42 minutes to get from his house to the cinema.  
He needs to arrive 10 minutes before the film starts.

What is the latest time Abdul can leave his house?

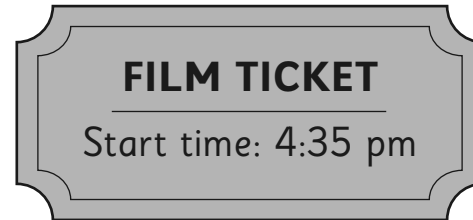
pm





16

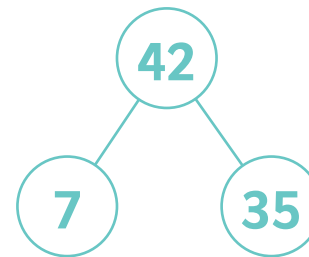
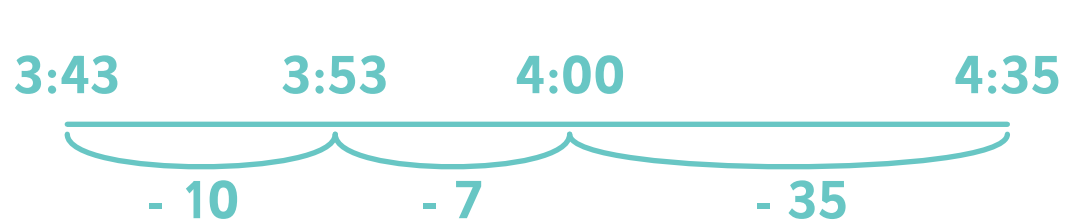
Abdul is going to see a film.



It takes Abdul 42 minutes to get from his house to the cinema.

He needs to arrive 10 minutes before the film starts.

What is the latest time Abdul can leave his house?



3:43 pm



16

Abdul is going to see a film.

**FILM TICKET**

Start time: 4:35 pm

When the film finishes, Abdul's watch shows this time:



How long was the film in hours and minutes?

hours

minutes



16

Abdul is going to see a film.

**FILM TICKET**

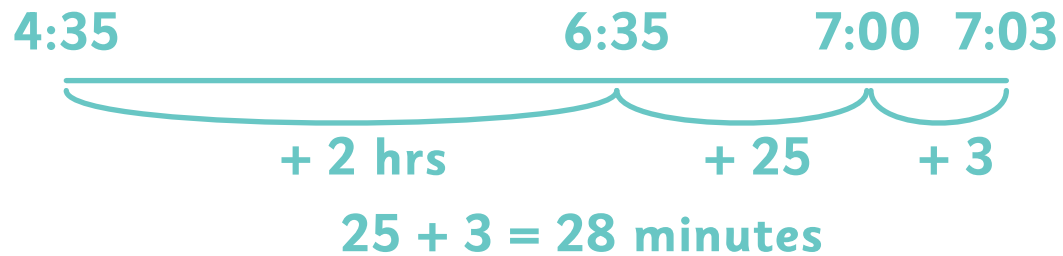
Start time: 4:35 pm

When the film finishes, Abdul's watch shows this time:

19:03

19:03 = 7:03 pm

How long was the film in hours and minutes?



2 hours 28 minutes

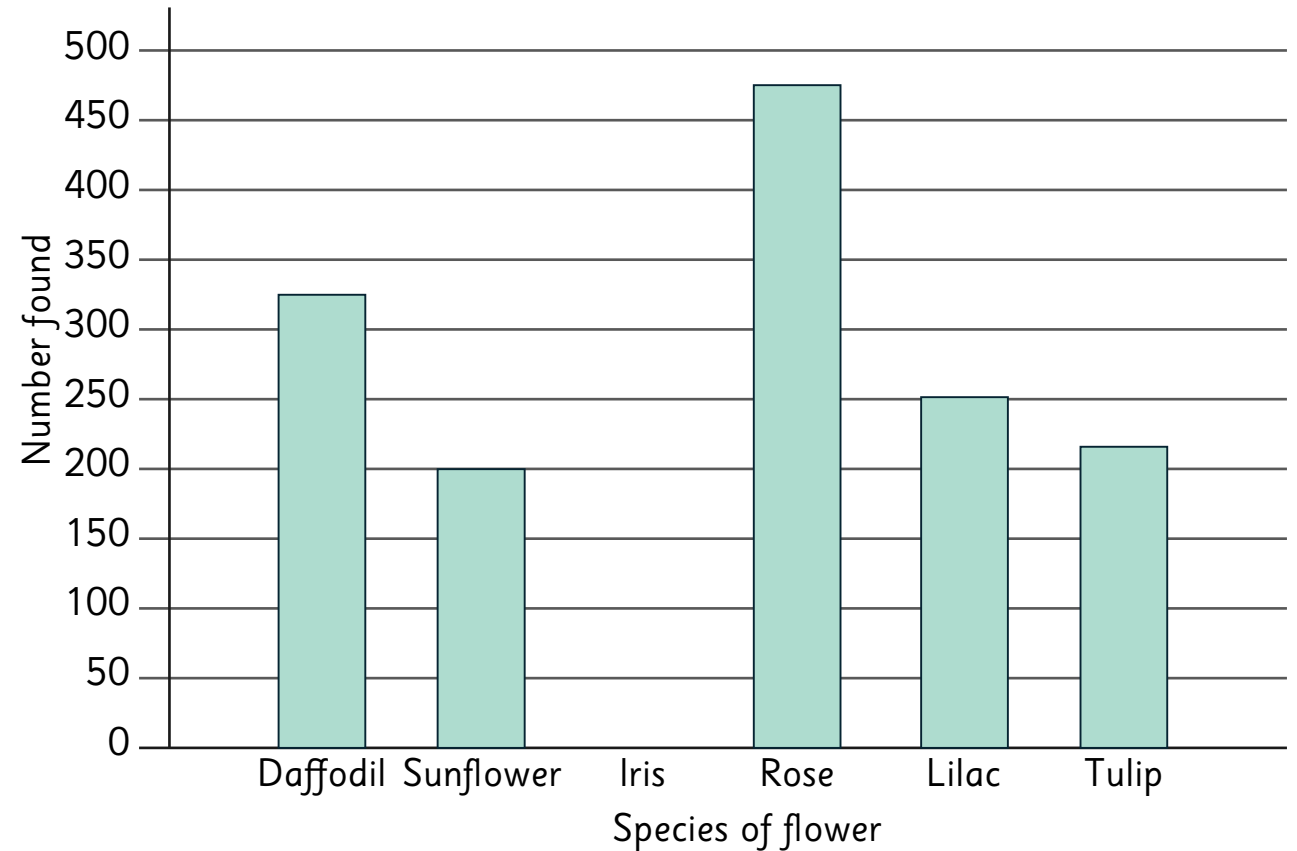


17

This table shows the number of different flower species found in a country garden.

Use the table to complete the graph.

Species of flower	Number found
Daffodil	325
Sunflower	200
Iris	425
Rose	475
Lilac	250
Tulip	210

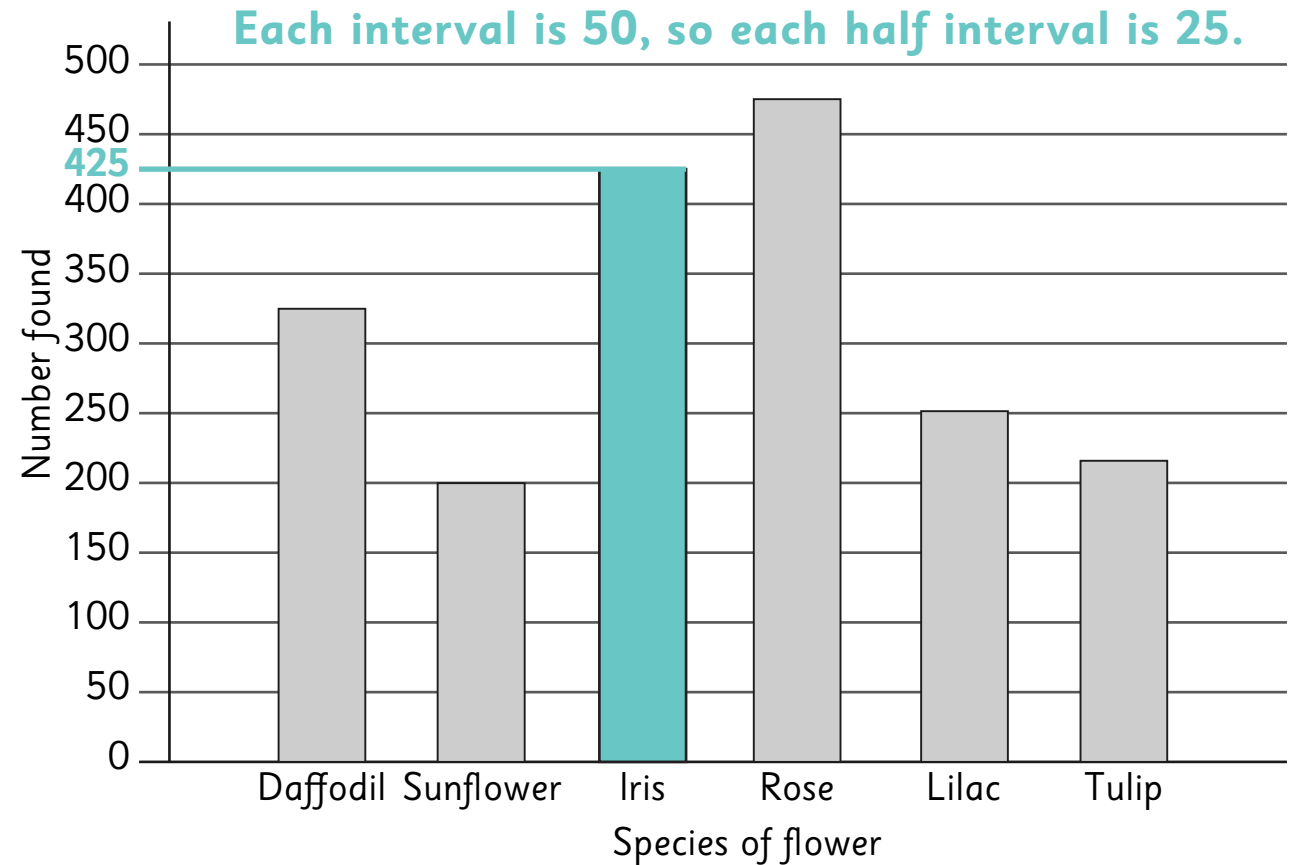


17

This table shows the number of different flower species found in a country garden.

Use the table to complete the graph.

Species of flower	Number found
Daffodil	325
Sunflower	200
Iris	425
Rose	475
Lilac	250
Tulip	210



18

24 children in Year 6 were gifted books.

Inaya says,

**“40% of the children were given a comedy book.”**

Can Inaya be correct? Circle Yes or No.

**Yes / No**

Explain your answer.



18

24 children in Year 6 were gifted books.

Inaya says,

**“40% of the children were given a comedy book.”**

Can Inaya be correct? Circle Yes or No.

Yes / **No**

Explain your answer.

**10% of 24 = 2.4, so 40% of 24 = 2.4 x 4 = 9.6**

**We can't have .6 of a child, so Inaya can not be correct**



19

Use the digit cards below to complete the calculation.

4

7

3

5

**x**

**-**

**=**





19

Use the digit cards below to complete the calculation.

<div>4</div>	<div>7</div>	<div>3</div>	<div>5</div>			
<div></div>	x	<div></div>	-	<div></div>	=	<div></div>

Some multiplications are too large for any of the other digit cards to provide the result ( $5 \times 7 = 35$ ,  $4 \times 7 = 28$ ,  $5 \times 4 = 20$ ,  $7 \times 3 = 21$ ).

We are left with  $3 \times 5 = 15$  or  $3 \times 4 = 12$ .

$$3 \times 5 = 15$$

$$15 - 7 = 8$$

$$15 - 5 = 10$$

This doesn't work.

$$3 \times 4 = 12$$

$$12 - 7 = 5$$

$$12 - 5 = 7$$

This works.

Our answer can be any of the following:

$$3 \times 4 - 7 = 5$$

$$3 \times 4 - 5 = 7$$

$$4 \times 3 - 7 = 5$$

$$4 \times 3 - 5 = 7$$



**20**

This table shows the favourite zoo animals of children in Year 6.

Animal	No. of children
Lion	20
Giraffe	15
Elephant	10
Gorilla	5

Tick the statements that are correct.

**20% of children like elephants best.**

☐

**$\frac{2}{5}$  of children like gorillas best.**

☐

**As a decimal, the proportion of children who prefer lions is 0.4.**

☐

**15% of children like giraffes best.**

☐

20

This table shows the favourite zoo animals of children in Year 6.

$$\frac{20}{50} = \frac{40}{100} = 40\% = 0.4$$

$$\frac{15}{50} = \frac{30}{100} = 30\%$$

$$\frac{10}{50} = \frac{20}{100} = 20\%$$

$$\frac{5}{50} = \frac{1}{10}$$

Animal	No. of children
Lion	20
Giraffe	15
Elephant	10
Gorilla	5

**Total children:**  
50 children

Tick the statements that are correct.

**20% of children like elephants best.**



**$\frac{2}{5}$  of children like gorillas best.**



**As a decimal, the proportion of children who prefer lions is 0.4.**

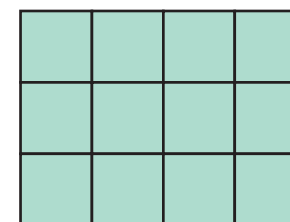
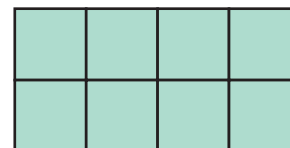
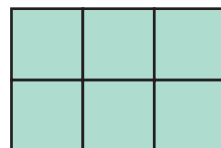
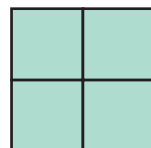
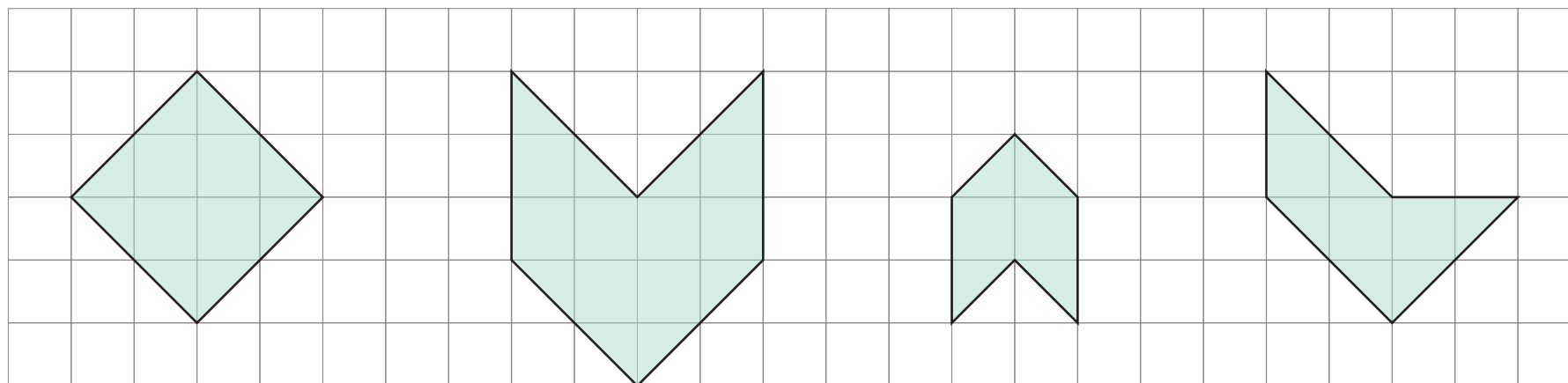


**15% of children like giraffes best.**



21

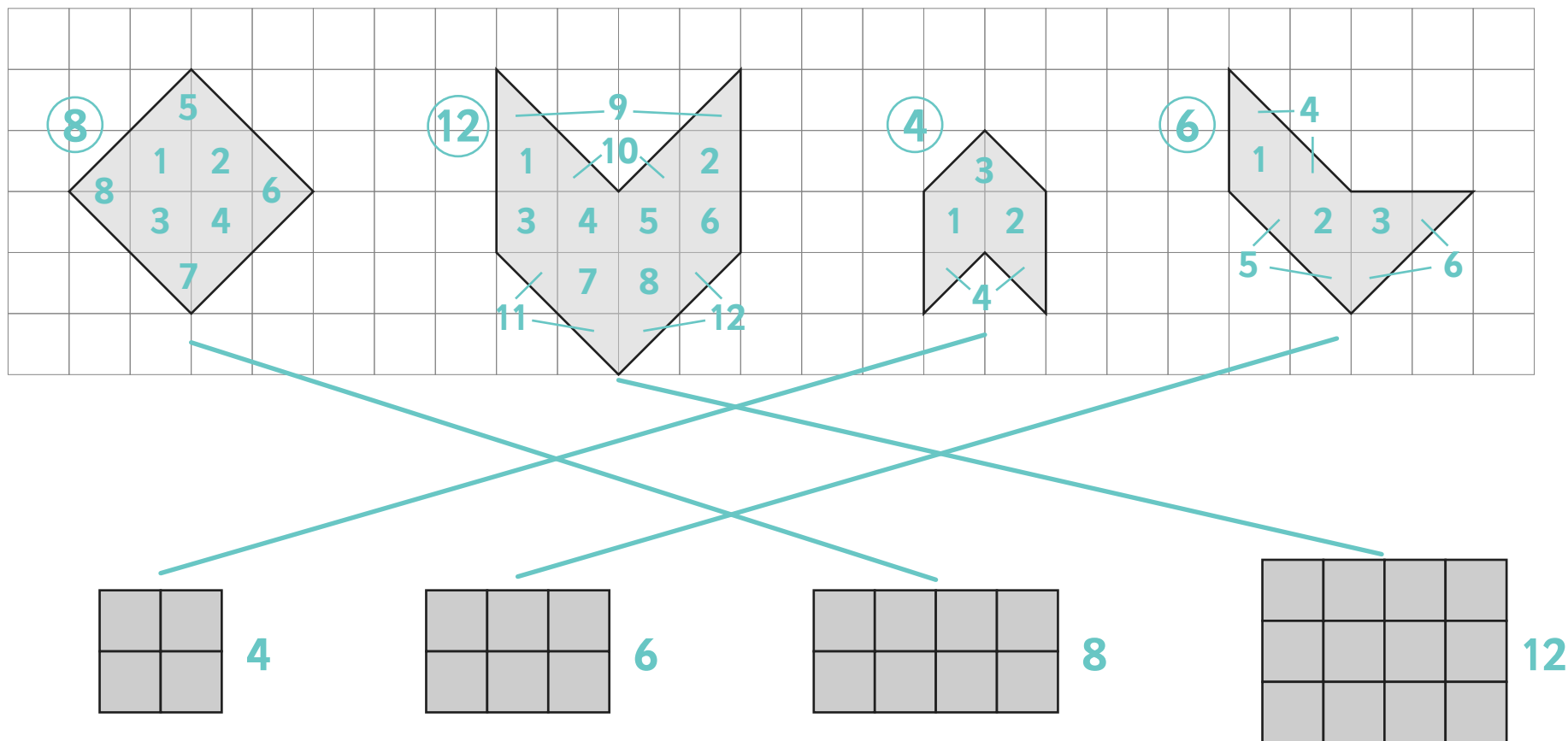
Match each shape to the one with **equal area**.



21

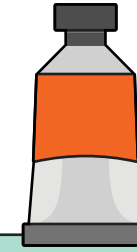
Match each shape to the one with **equal area**.

Count the squares. Remember  $2 \times \frac{1}{2}$  squares = 1 whole square.



22

James is given some pocket money.  
He buys three tubes of paint and two paintbrushes.  
He has one-quarter of his money left.



Tube of paint  
£1.30



Paintbrush  
90p

How much pocket money was he given?

£

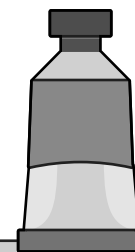


22

James is given some pocket money.

He buys three tubes of paint and two paintbrushes.

He has one-quarter of his money left.



Tube of paint  
£1.30



Paintbrush  
90p

How much pocket money was he given?

Tubes of paint

$$£1.30 \times 3 = £3.90$$

$$\begin{array}{r} 1.30 \\ \times 3 \\ \hline 3.90 \end{array}$$

Paintbrushes

$$90p \times 2 = 180p \\ = £1.80$$

$$\begin{array}{r} 90 \\ \times 2 \\ \hline 180 \end{array}$$

Total

$$£3.90 + £1.80 \\ = £5.70$$

$$\begin{array}{r} 3.90 \\ + 1.80 \\ \hline 5.70 \\ 1 \end{array}$$

Money given

One-quarter left means three-quarters spent.

$$\frac{3}{4} = £5.70$$

$$\frac{1}{4} = £5.70 \div 3 = £1.90$$

$$\text{Whole} = \frac{4}{4} = £1.90 \times 4 = £7.60$$

$$\begin{array}{r} 190 \\ 3 \overline{) 570} \end{array}$$

$$\begin{array}{r} 1.90 \\ \times 4 \\ \hline 7.60 \\ 3 \end{array}$$

£ 7.60



**23**

When  $x = 8$ , what is the value of each expression below?

$x + 23$

 $=$ 

$x - 5$

 $=$ 

$3x$

 $=$ 



**23**

When  $x = 8$ , what is the value of each expression below?

Substitute the number 8 for the letter  $x$  in each expression.

$$8 + 23 = 31$$

$$x + 23$$

$$=$$

31

$$8 - 5 = 3$$

$$x - 5$$

$$=$$

3

$$3 \times 8 = 24$$

$$3x$$

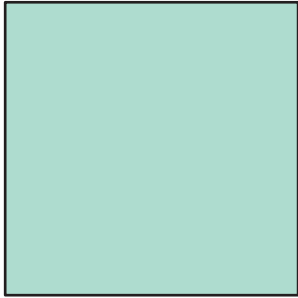
$$=$$

24

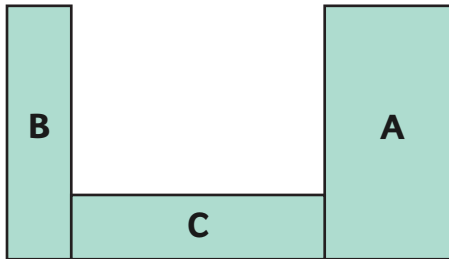


24

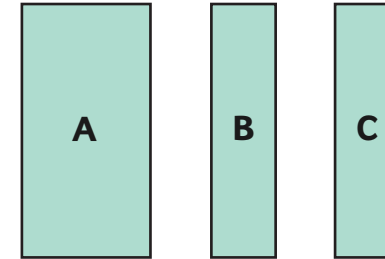
The area of a square is  $36 \text{ cm}^2$ .



Rectangles **A**, **B** and **C** are used to make a new shape.



The square is cut into 3 rectangles. Rectangle **B** and **C** have an area **half** the size of rectangle **A**.

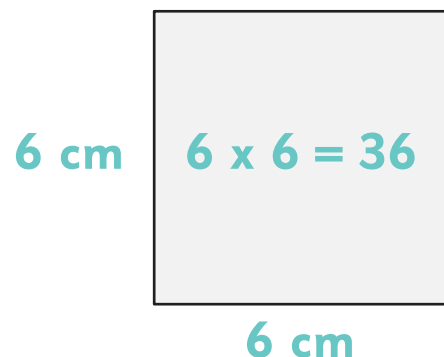


Calculate the **perimeter** of the shape.



24

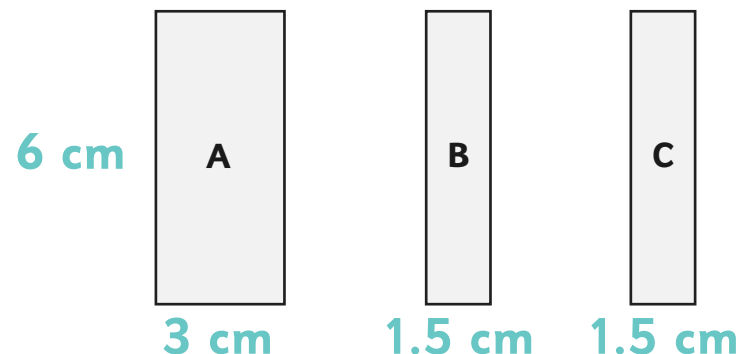
The area of a square is  $36 \text{ cm}^2$ .



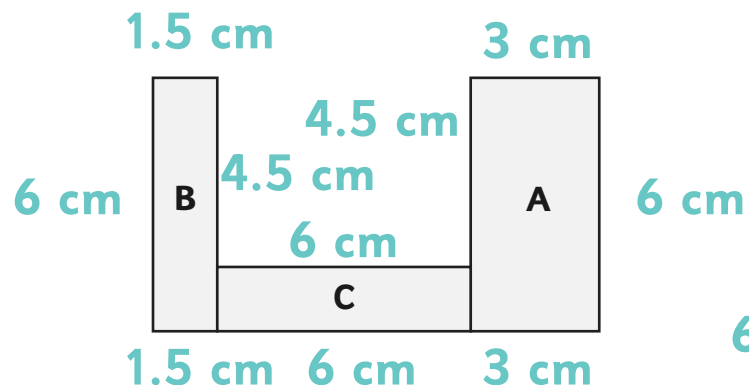
$$6 \div 2 = 3$$

$$3 \div 2 = 1.5$$

The square is cut into 3 rectangles. Rectangle **B** and **C** have an area **half** the size of rectangle **A**.



Rectangles **A**, **B** and **C** are used to make a new shape.



$$6 - 1.5 = 4.5$$

Calculate the **perimeter** of the shape.

$$(6 + 6 + 6 + 6) + (1.5 + 1.5) + (4.5 + 4.5) + (3 + 3) =$$

$$24 + 3 + 9 + 6 = 27 + 15 = 42$$

