2017 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						

F 0 0 7 0 A 0 1 2 4

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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.

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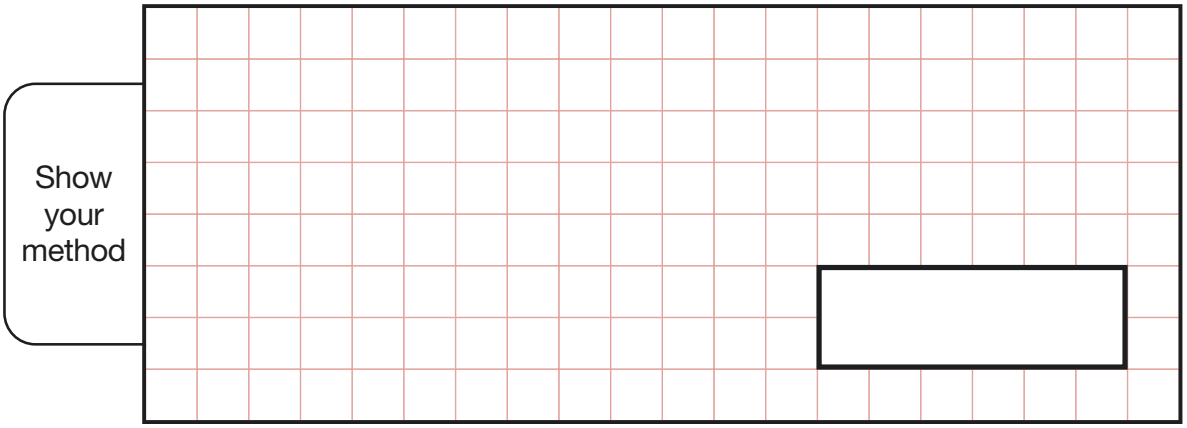
Do not write over any barcodes.

Some questions have a method box like this:



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

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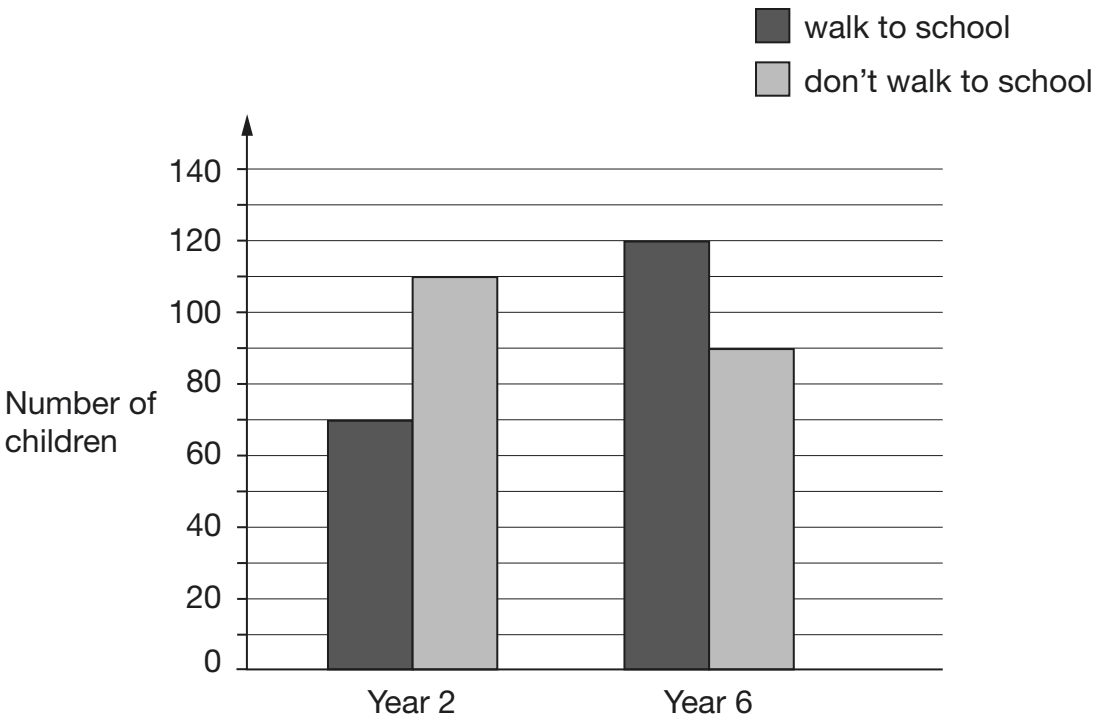
Marks

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

1 William asks the children in Year 2 and Year 6 if they walk to school.

This graph shows the results.



Altogether, how many children **don't** walk to school?

1 mark

How many **more** Year 6 children than Year 2 children walk to school?

1 mark

2 Circle the number that is **10 times** greater than nine hundred and seven.

9,700 907 9,007 970 9,070

1 mark

3 Write the missing numbers to make this **multiplication** grid correct.

×	□	□
9	63	54
□	56	48

1 mark

4 This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?

Show your method

m

2 marks

5 Complete this table with the missing numbers.

One row has been done for you.

Number	1,000 more
3,500	4,500
85	
	9,099
	15,250

2 marks

6 Write these numbers in order of size, starting with the **smallest**.

1.9 0.96 1.253 0.328

smallest

1 mark

7 Write the missing numbers.

60 months = ☐ years

72 hours = ☐ days

84 days = ☐ weeks

2 marks

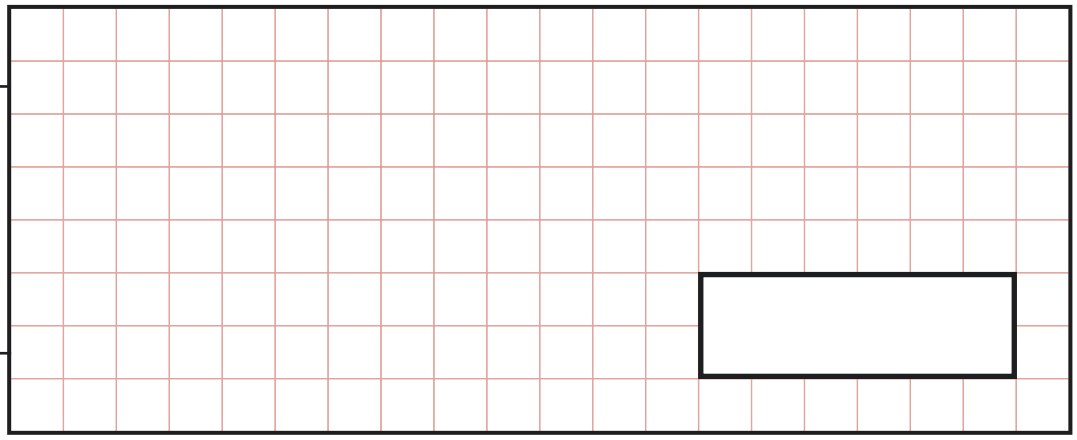
8 At the start of June, there were 1,793 toy cars in the shop.

During June,

- 8,728 more toy cars were delivered
- 9,473 toy cars were sold.

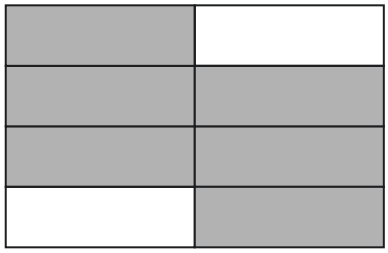
How many toy cars were left in the shop at the end of June?

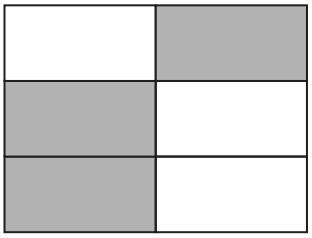
Show your method

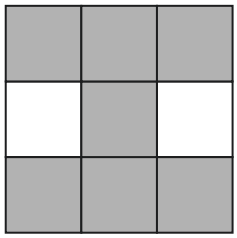


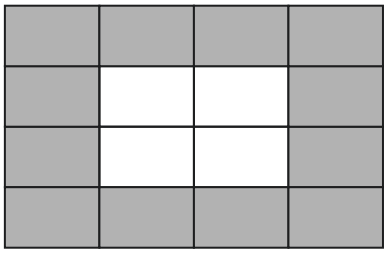
2 marks

9 Tick two shapes that have $\frac{3}{4}$ shaded.









1 mark

10 Round **84,516**

to the nearest 10 ☐

to the nearest 100 ☐

to the nearest 1,000 ☐

2 marks

11 Here is a rule for the time it takes to cook a chicken.

Cooking time = 20 minutes plus an extra 40 minutes for each kilogram

How many minutes will it take to cook a 3 kg chicken?

minutes

1 mark

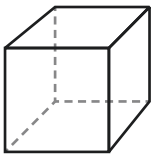
What is the mass of a chicken that takes 100 minutes to cook?

kg

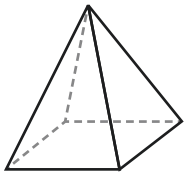
1 mark

12 Here are diagrams of some 3-D shapes.

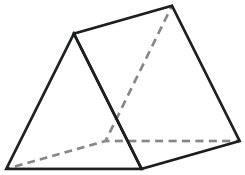
Tick each shape that has the same number of faces as vertices.



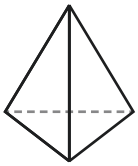
Cube ☐



Square-based pyramid ☐



Triangular prism ☐



Triangular-based pyramid ☐

2 marks

13 Ally and Jack buy some stickers.

Pack of 12 stickers
£10.49

12 stickers
99p each

Ally buys a pack of 12 stickers for £10.49

Jack buys 12 single stickers for 99p each.

How much more does Jack pay than Ally?

Show your method

£

2 marks

14 Amina planted some seeds.

For every 3 seeds Amina planted, only 2 seeds grew.

Altogether, 12 seeds grew.

How many seeds did Amina **plant**?

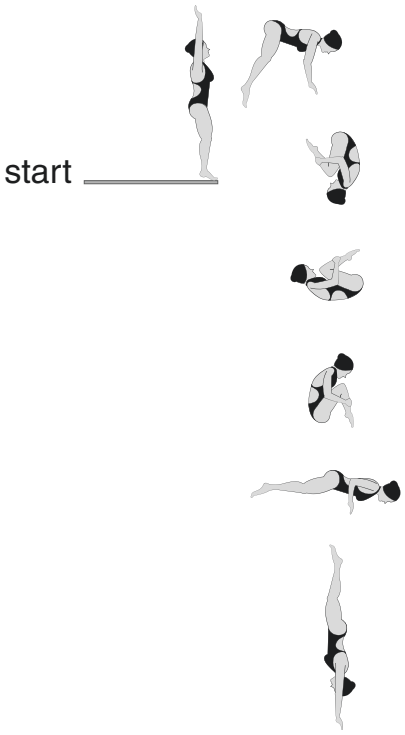
1 mark

15 At the end of a film, the year is given in Roman numerals.

Write the year MMVI in **figures**.

1 mark

16 Layla completes one-and-a-half somersaults in a dive.



How many **degrees** does Layla turn through in her dive?

°

1 mark

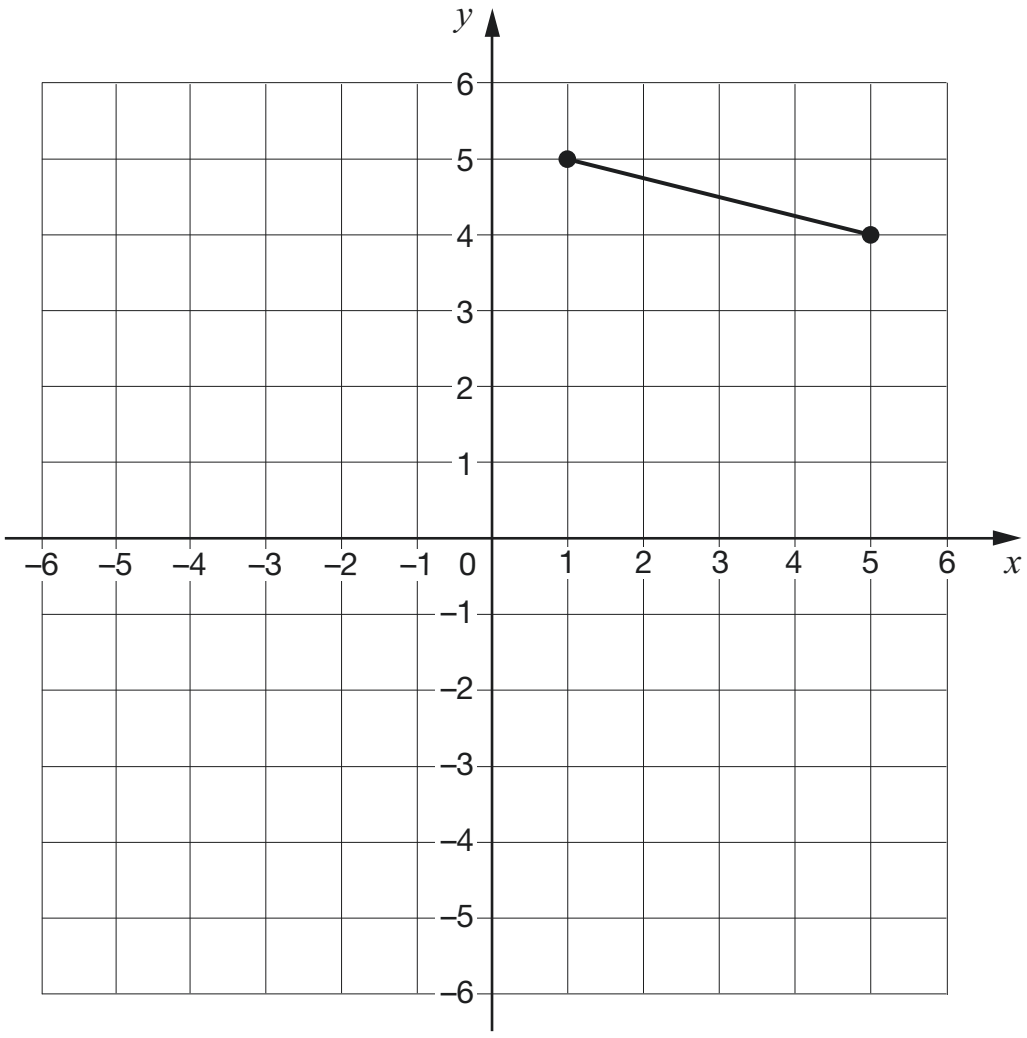
17 The vertices of a quadrilateral have these coordinates.

(1, 5) (5, 4) (1, –3) (–3, 4)

One side of the quadrilateral has been drawn on the grid.

Complete the quadrilateral.

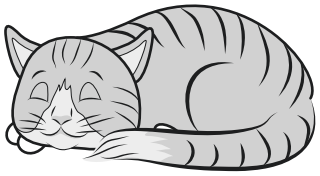
Use a ruler.



1 mark

18 A cat sleeps for **12 hours** each day.

50% of its life is spent asleep.



Write the missing percentage.

A koala sleeps for **18 hours** each day.

	%

of its life is spent asleep.

1 mark

19 Amina posts three large letters.

The postage costs the same for each letter.

She pays with a £20 note.

Her change is £14.96

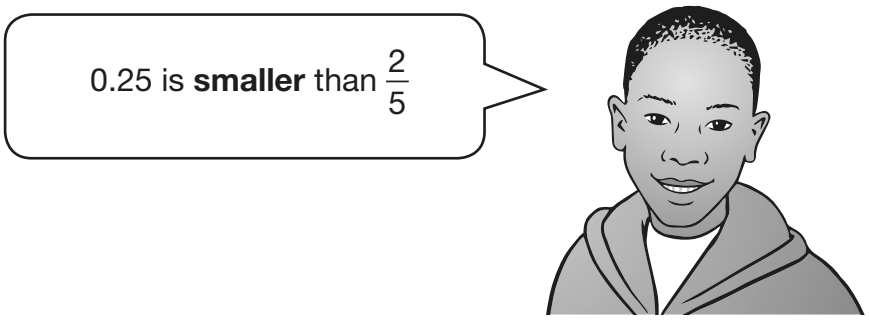
What is the cost of posting **one** letter?

Show your method

£

2 marks

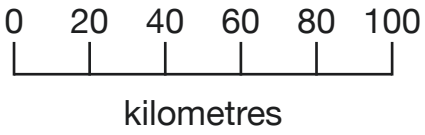
20 Adam says,



Explain why he is correct.

1 mark

21 On a map, 1cm represents 20 km.



The distance between two cities is **250 km**.

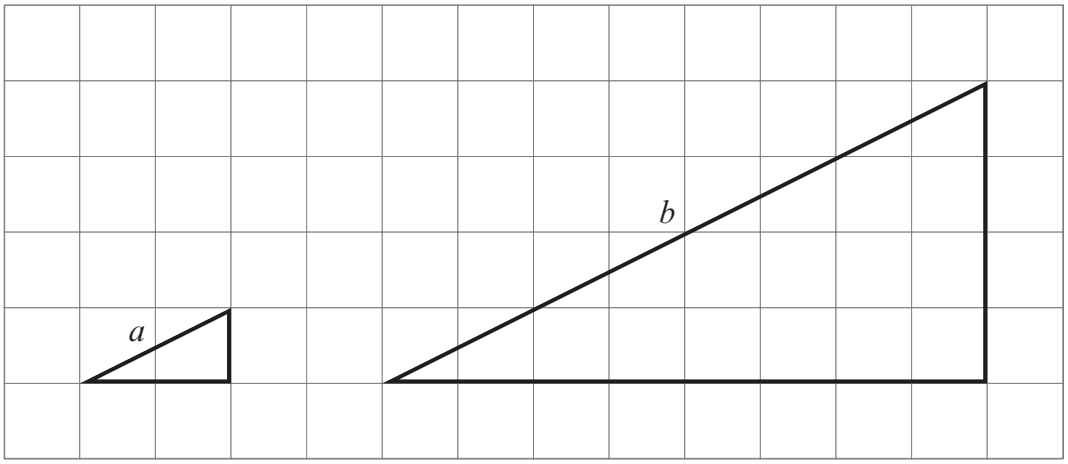
On the map, what is the distance between the two cities?

Show your method

cm

2 marks

22 Here are two similar right-angled triangles.

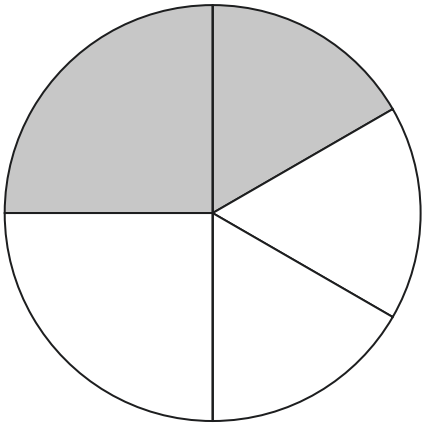


Write the ratio of side a to side b.

$a : b =$ [:]

1 mark

23 In this circle, $\frac{1}{4}$ and $\frac{1}{6}$ are shaded.



What fraction of the whole circle is **not** shaded?

Show your method

2 marks

Standards
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2017 key stage 2 mathematics
Paper 2: reasoning
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Electronic PDF version product code: STA/17/7737/e ISBN: 978-1-78644-296-3

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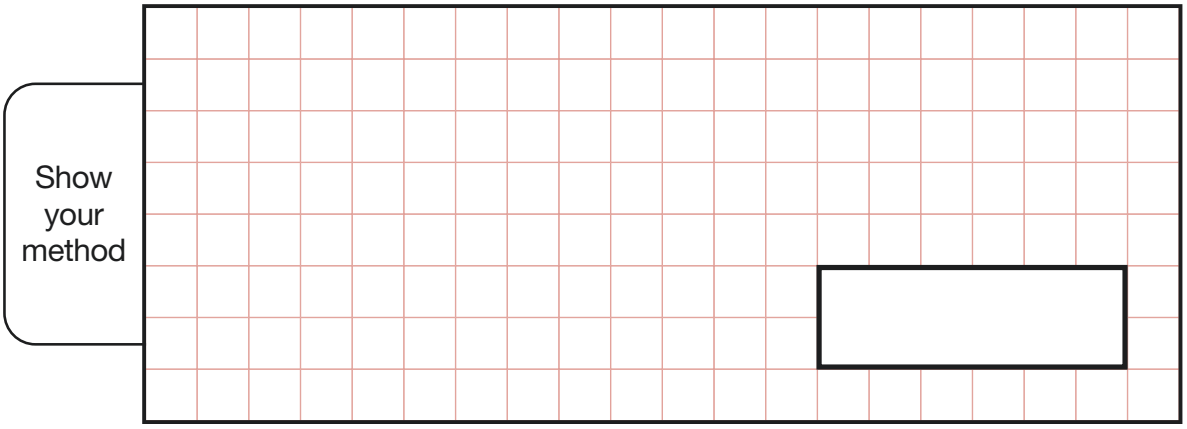

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Marks

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

$$75 \div \square = 7.5$$

1 mark

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

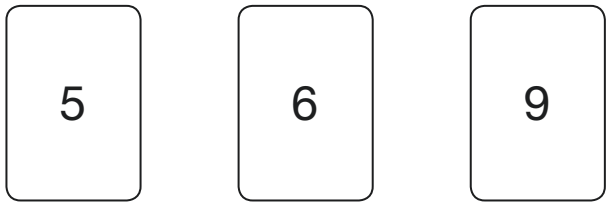
They share the money **equally**.

They get £16 each.

How many friends are in the group?

1 mark

3 Chen uses these digit cards.

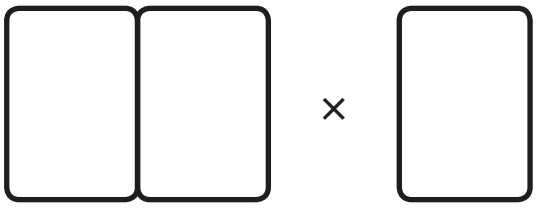


She makes a 2-digit number and a 1-digit number.

She multiplies them together.

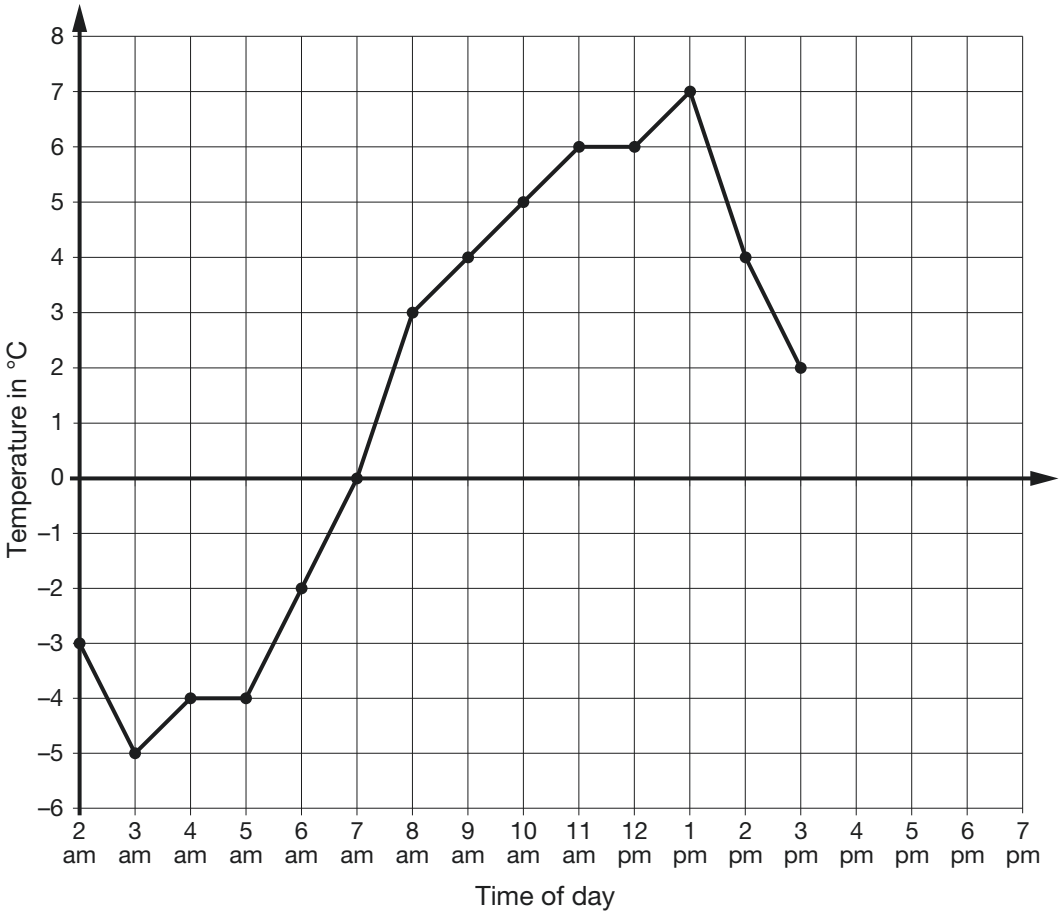
Her answer is a **multiple of 10**

What could Chen's multiplication be?



1 mark

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?

°C

1 mark

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

What was the temperature at 6 pm?

°C

1 mark

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?

£

1 mark

6 William wants to travel to Paris by train.

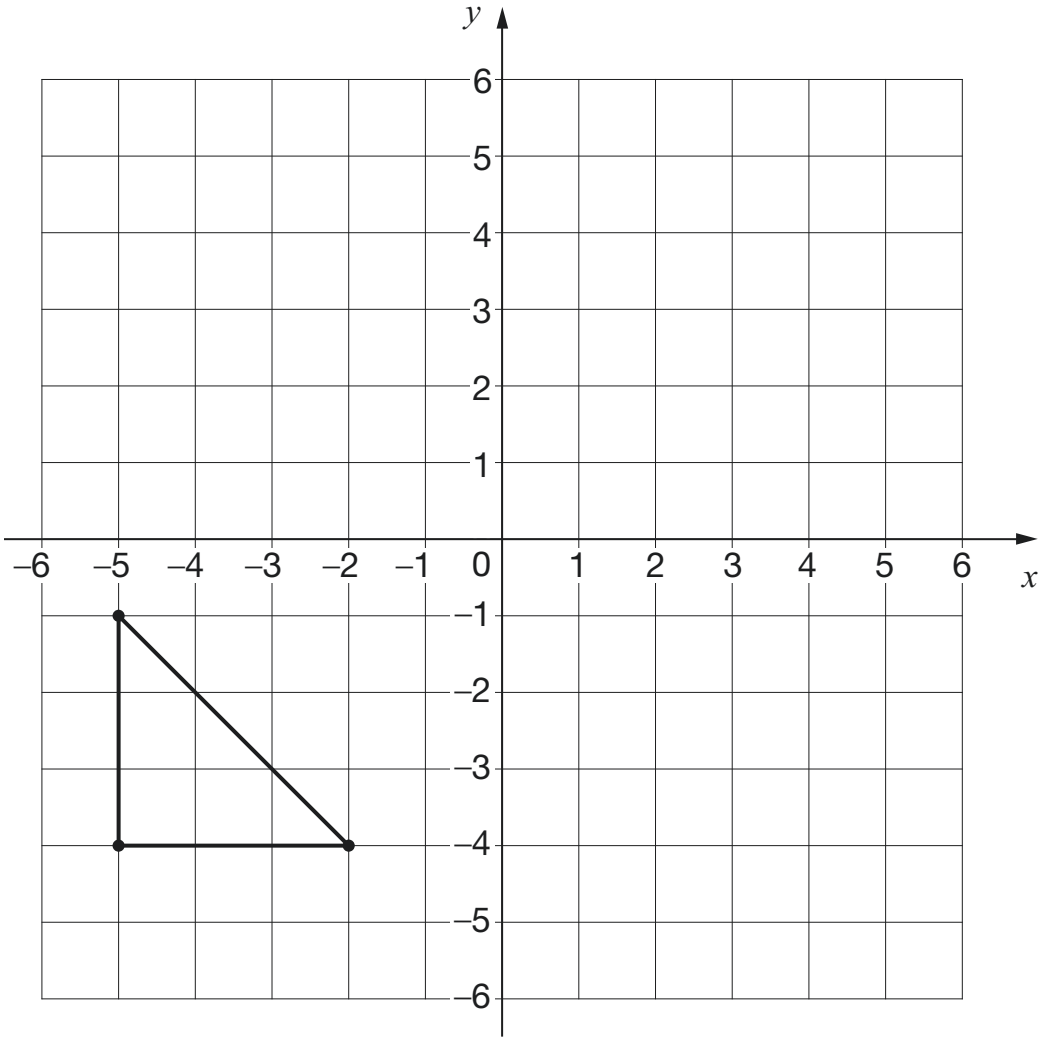
He needs to arrive in Paris by **5:30 pm**.

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

1 mark

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.

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

2 marks

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	Maths	English	Maths
10:30 am–11:00 am	Break	Break	Break	Break	Break
11:00 am–12:00 pm	English	Maths	Science	Maths	English

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

hours

1 mark

10 A bottle contains 568 millilitres of milk.

Jack pours out **half a litre**.

How much milk is left?

1 mark

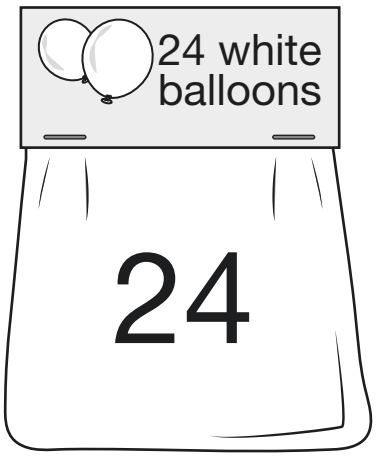
11 A bicycle wheel has a diameter of 64 cm.

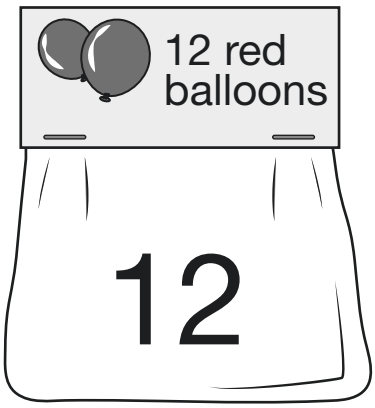
What is the **radius** of the bicycle wheel?

cm

1 mark

12





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

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

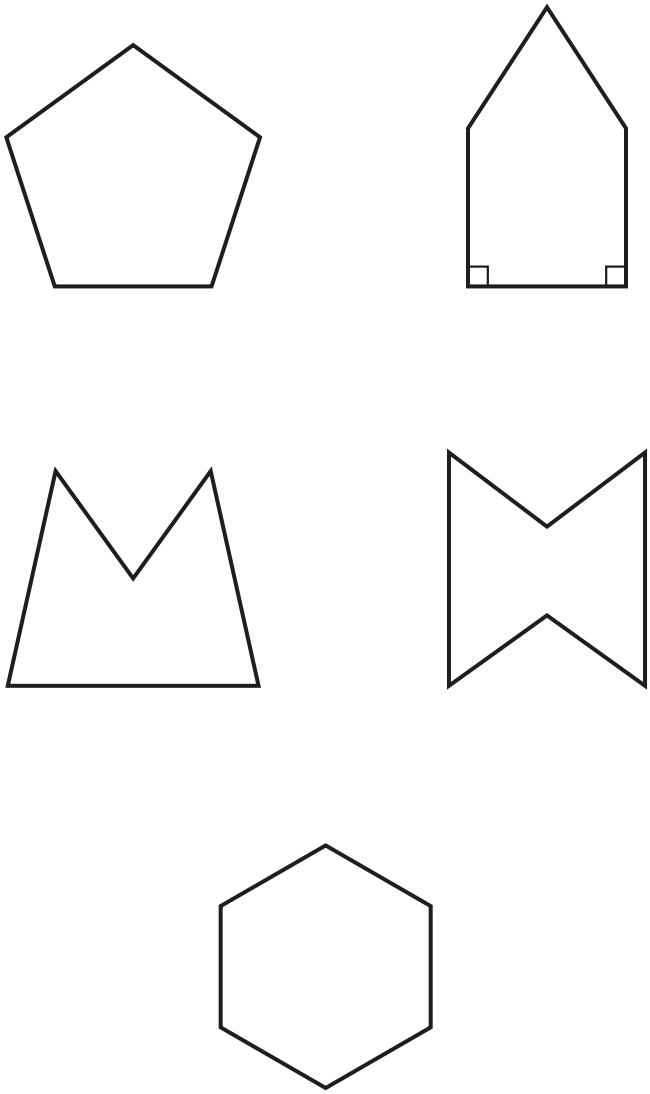
Adam says,

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

Explain why Adam is correct.

1 mark

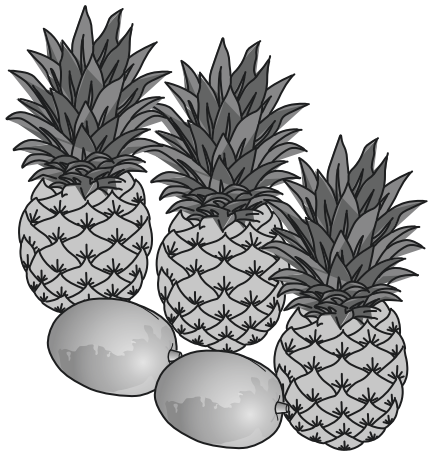
13 Circle the **pentagon** with exactly **four acute angles**.



1 mark

14 3 pineapples cost the same as 2 mangoes.

One mango costs £1.35



How much does **one** pineapple cost?

Show your method

£

2 marks

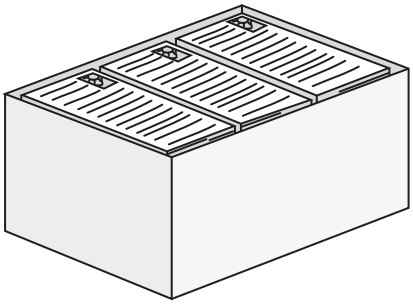
15 Look at the letters below.

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

A C E L Z

1 mark

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

2 marks

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

$1\frac{1}{2}$	1.2
$1\frac{1}{4}$	1.3
$1\frac{5}{100}$	1.4
$1\frac{3}{5}$	1.5

2 marks

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

What are the two numbers?

square number + prime number = 22

1 mark

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

He multiplies it by 4

He rounds his answer to the nearest 10

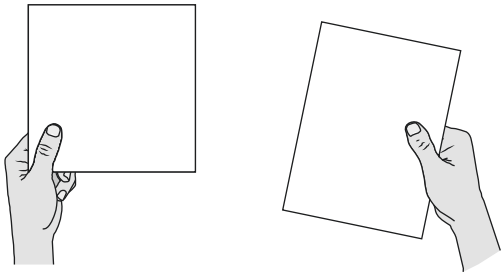
The result is 50

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

_____

2 marks

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

cm^2

3 marks

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

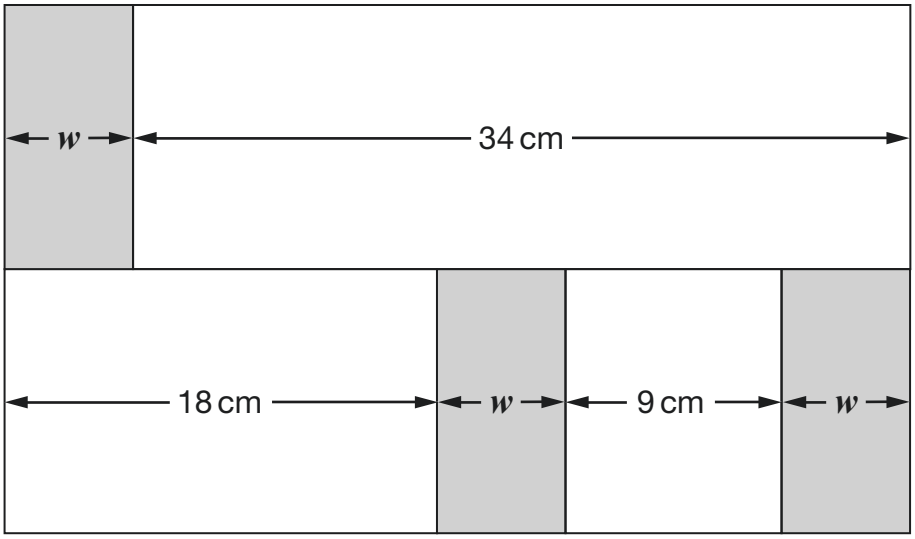
Write the missing numbers.

	1	$1\frac{5}{8}$	$2\frac{1}{4}$	

1 mark

1 mark

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

cm

2 marks

23 Here is a pattern of number pairs.

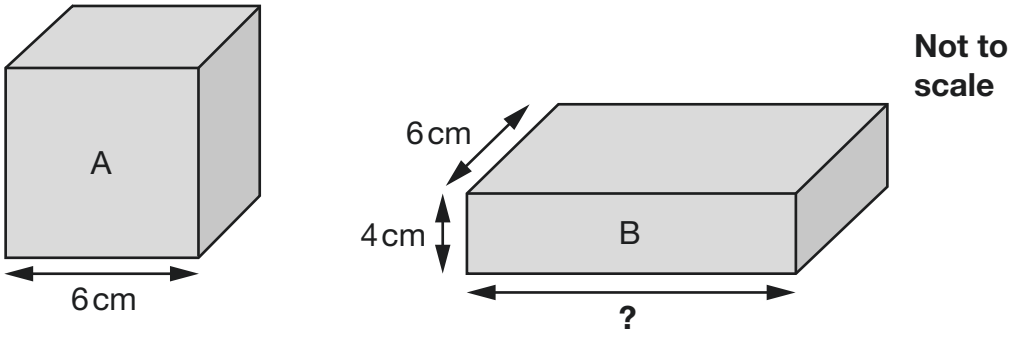
a	b
1	9
2	19
3	29
4	39

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

$b = \square \times a - \square$

1 mark

24 Cube A and cuboid B have the same volume.



Not to scale

Calculate the missing length on cuboid B.

Show your method

cm

2 marks

Standards & Testing Agency

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Paper 3: reasoning
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2018 national curriculum tests

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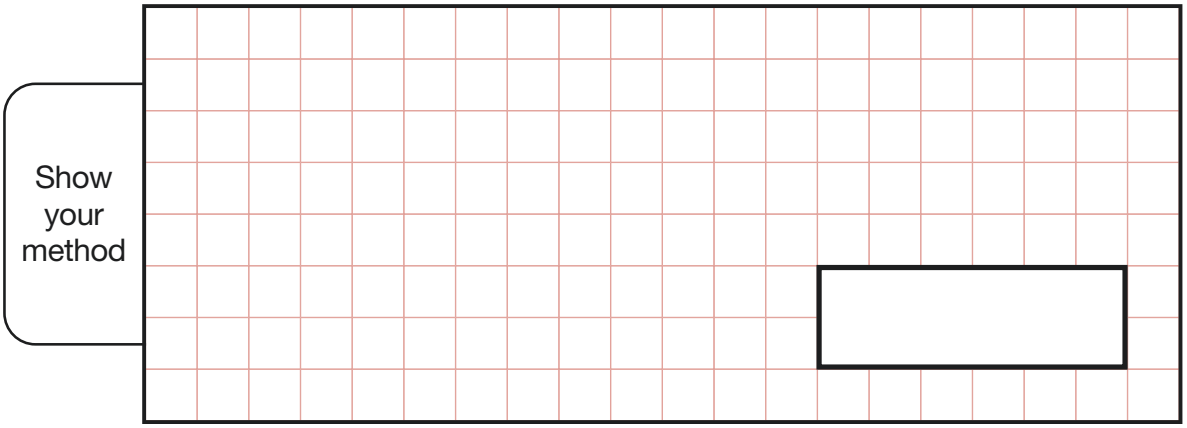

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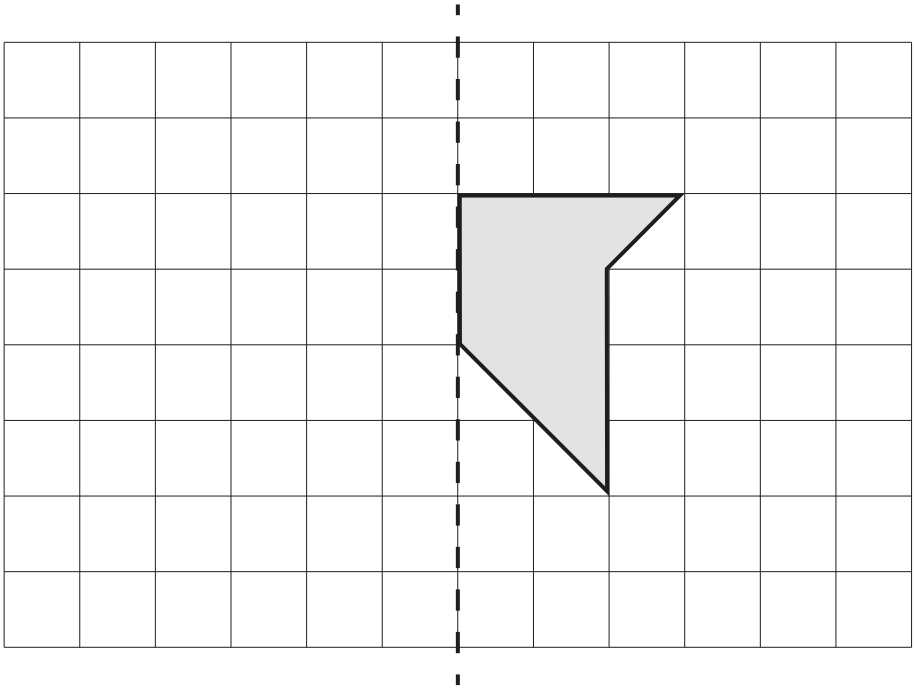
1 Here is a shape on a grid.

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

Use a ruler.



1 mark

2 Stefan completes this calculation.

$$\begin{array}{r} 95 \\ -\ 67 \\ \hline 28 \end{array}$$

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

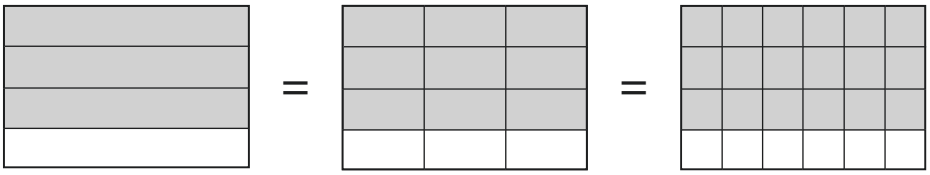
$$\begin{array}{r} \square\square \\ +\ \square\square \\ \hline \square\square \end{array}$$

1 mark

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.

$$\frac{3}{4} = \frac{9}{\square} = \frac{\square}{24}$$

1 mark

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

	Temperature	
City	**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?

degrees

1 mark

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

_____

1 mark

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

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

What is the next number in the sequence?

1 mark

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

Tick **two**.

0.25 ☐

0.75 ☐

$\frac{25}{100}$ ☐

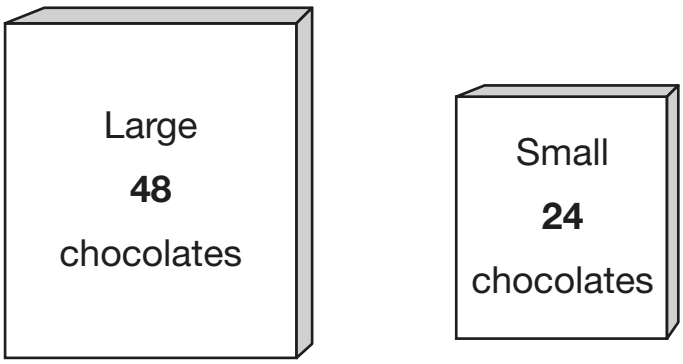
0.5 ☐

$\frac{2}{5}$ ☐

1 mark

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

chocolates

2 marks

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

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

Adam says,

Adam is **not** correct.

Explain how you know.

1 mark

10

>	=	<

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

11×12 ☐ 15×10

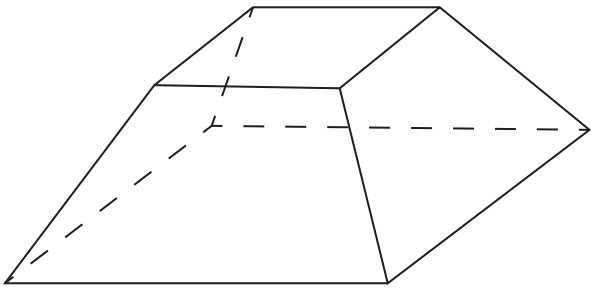
$90 \div 30$ ☐ $60 \div 20$

$120 \div 4$ ☐ $160 \div 8$

30×8 ☐ 100×10

2 marks

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



Complete the table.

Number of faces	Number of vertices	Number of edges

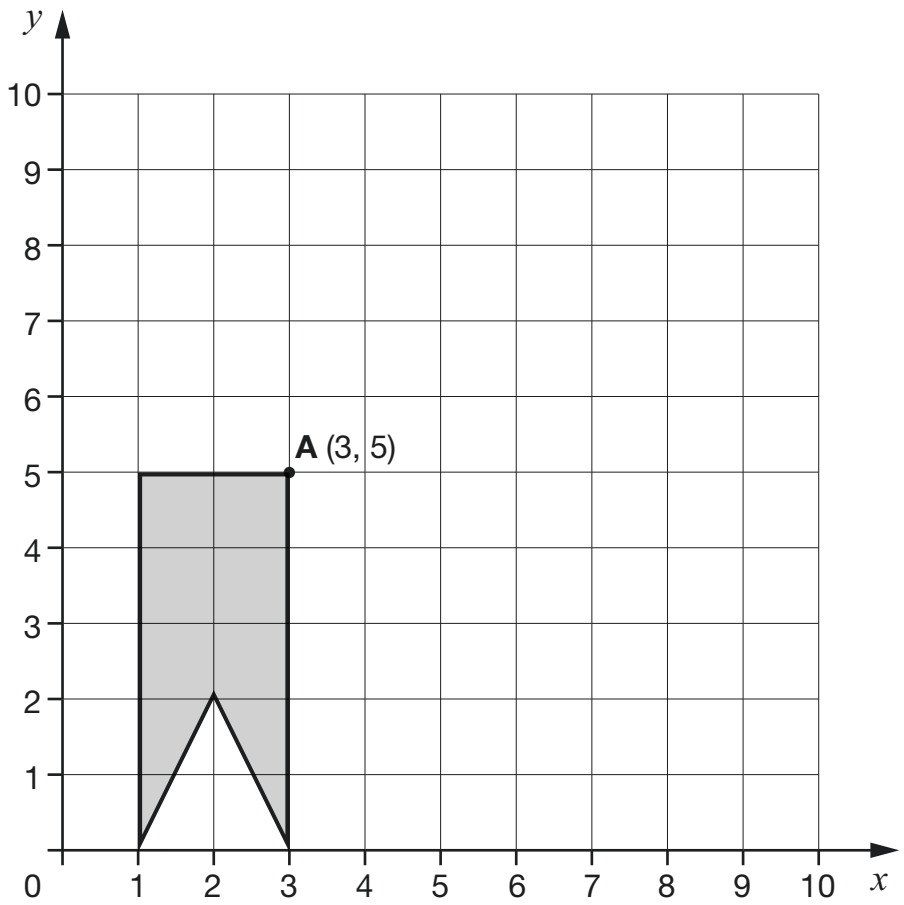
2 marks

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

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

14 $\frac{6}{5}$ $\frac{3}{5}$ $\frac{3}{4}$

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

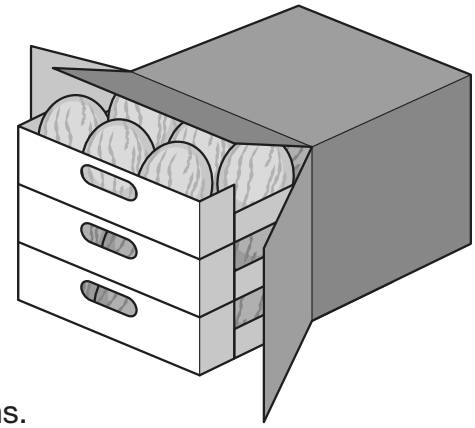
smallest

1 mark

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

melons

2 marks

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

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?

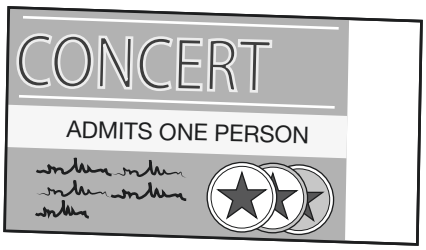
Show your method

3 marks

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

£

2 marks

19 Layla wants to estimate the answer to this calculation.

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

Tick the calculation below that is the best estimate.

Tick **one**.

3 – 2 + 2 ☐

4 – 2 + 1 ☐

4 – 2 + 2 ☐

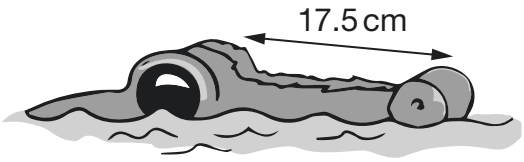
3 – 2 + 1 ☐

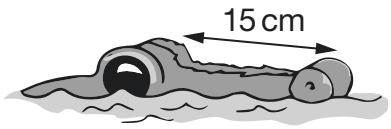
1 mark

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

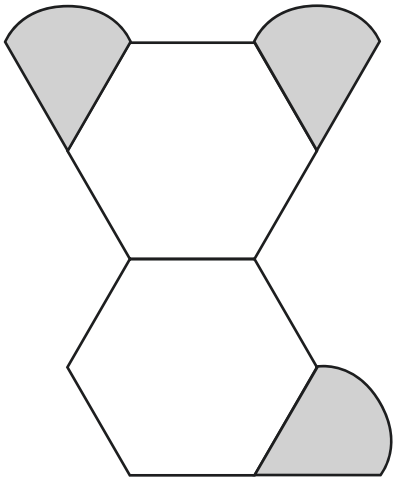
Show your method

cm

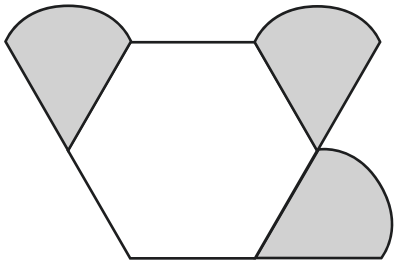
2 marks

21 Amina is making designs with two different shapes.

She gives each shape a value.

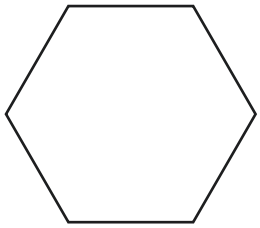


Total value is 147

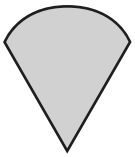


Total value is 111

Calculate the value of each shape.

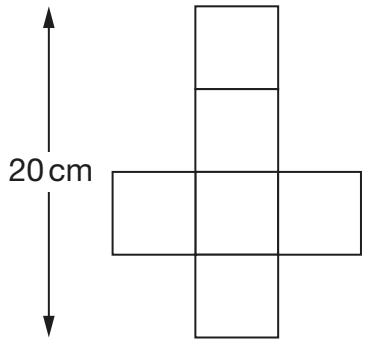
 = ☐

1 mark

 = ☐

1 mark

22 This is the net of a cube.



Not actual size

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

cm^3

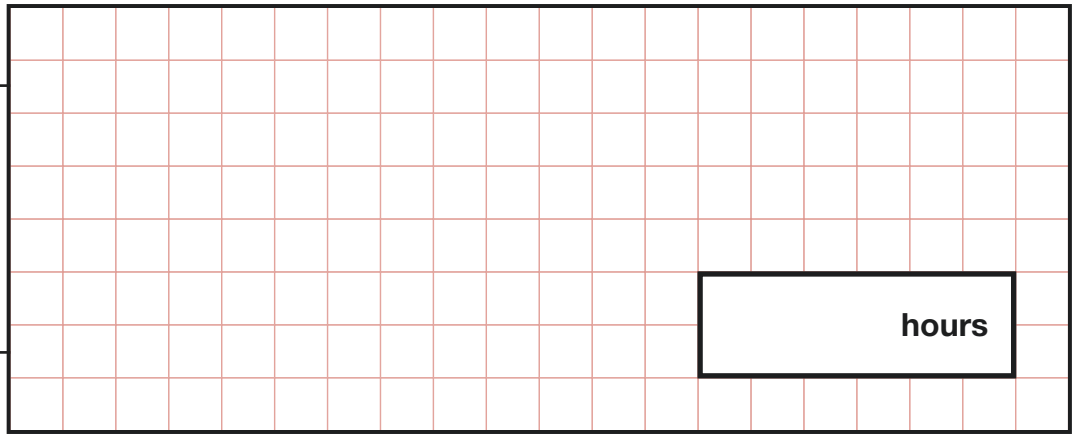
1 mark

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

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

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2018 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						

GO0080A0124

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Please do not write on this page.

Instructions

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Questions and answers

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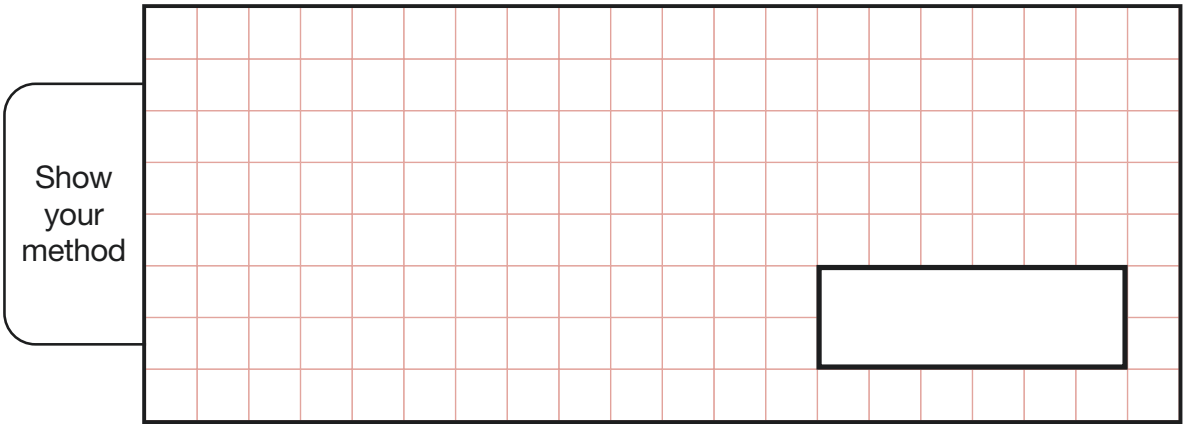

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Marks

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

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

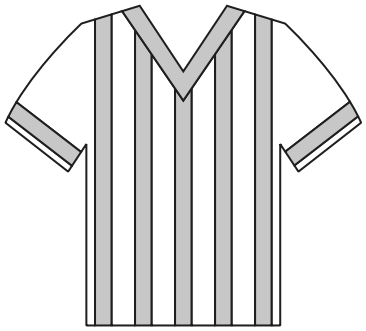
Write the missing numbers.

☐ 42 49 ☐ 63 ☐

2 marks

2 Adam chooses the colours for a new team shirt.

The shirt has **two** colours.



There are four colours to choose from: **yellow**, **blue**, **white** and **red**.

Write the **two** missing combinations.

The shirt could be:

- yellow and blue
- yellow and white
- yellow and red
- blue and white.

_____ and _____

_____ and _____

1 mark

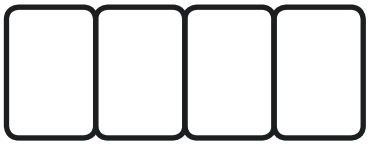
3 Here are four number cards.

Layla uses each card once to make a four-digit number.

She places:

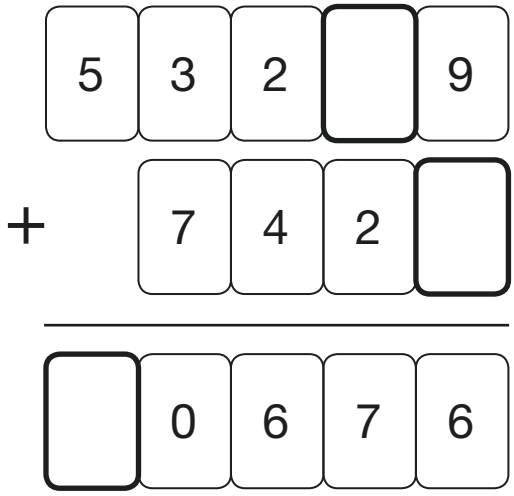
- 4 in the tens column
- 2 so that it has a higher value than any of the other digits
- the remaining two digits so that 7 has the higher value.

Write a digit in each box to show Layla's number.



1 mark

4 Write the three missing digits to make this **addition** correct.



2 marks

5 Tick the numbers that are common factors of both **12 and 18**

2 ☐

3 ☐

6 ☐

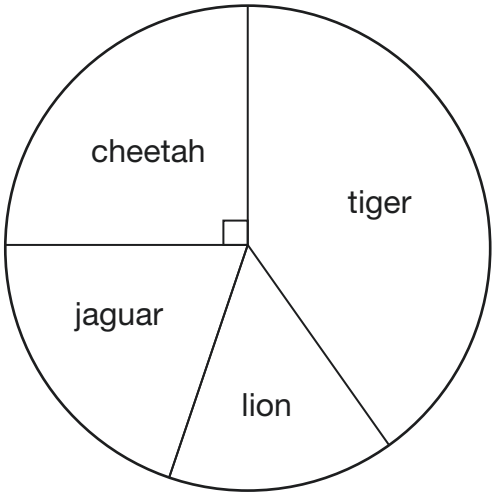
9 ☐

12 ☐

2 marks

6 This chart shows the number of different types of big cat in a zoo.

There are **20** big cats in the zoo altogether.



Here are some statements about the chart.

Tick the statements that are **true**.

There are more cheetahs than jaguars. ☐

The total number of lions and tigers is 10 ☐

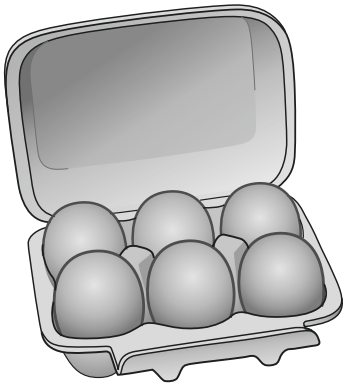
One-quarter of the big cats are cheetahs. ☐

There are more than 5 jaguars. ☐

2 marks

7 A farmer is packing eggs.

Each box holds **six** eggs.



The farmer has 980 eggs to pack.

How many boxes can the farmer **fill** using 980 eggs?

full boxes

1 mark

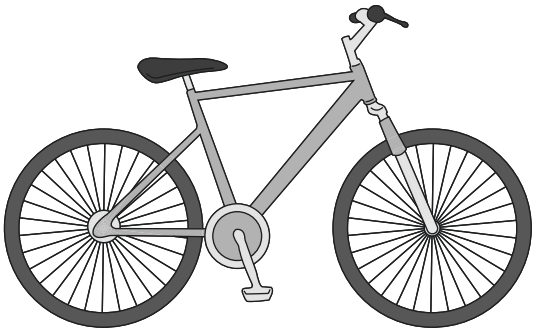
How many eggs will be left over?

left over

1 mark

8 Jack has £400

He spends **35%** of his money on a new bike.



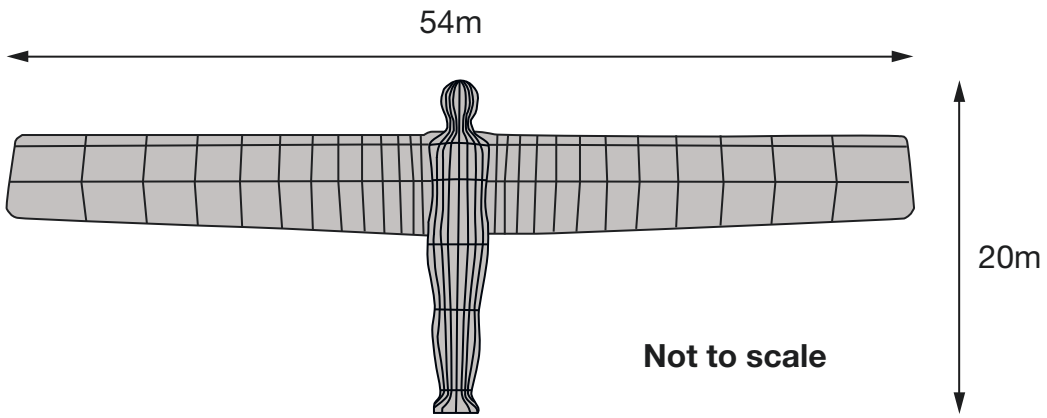
How much does Jack spend on his new bike?

£

1 mark

9 The Angel of the North is a large statue in England.

It is 20 metres tall and 54 metres wide.



Ally makes a scale model of the Angel of the North.

Her model is 40 centimetres tall.

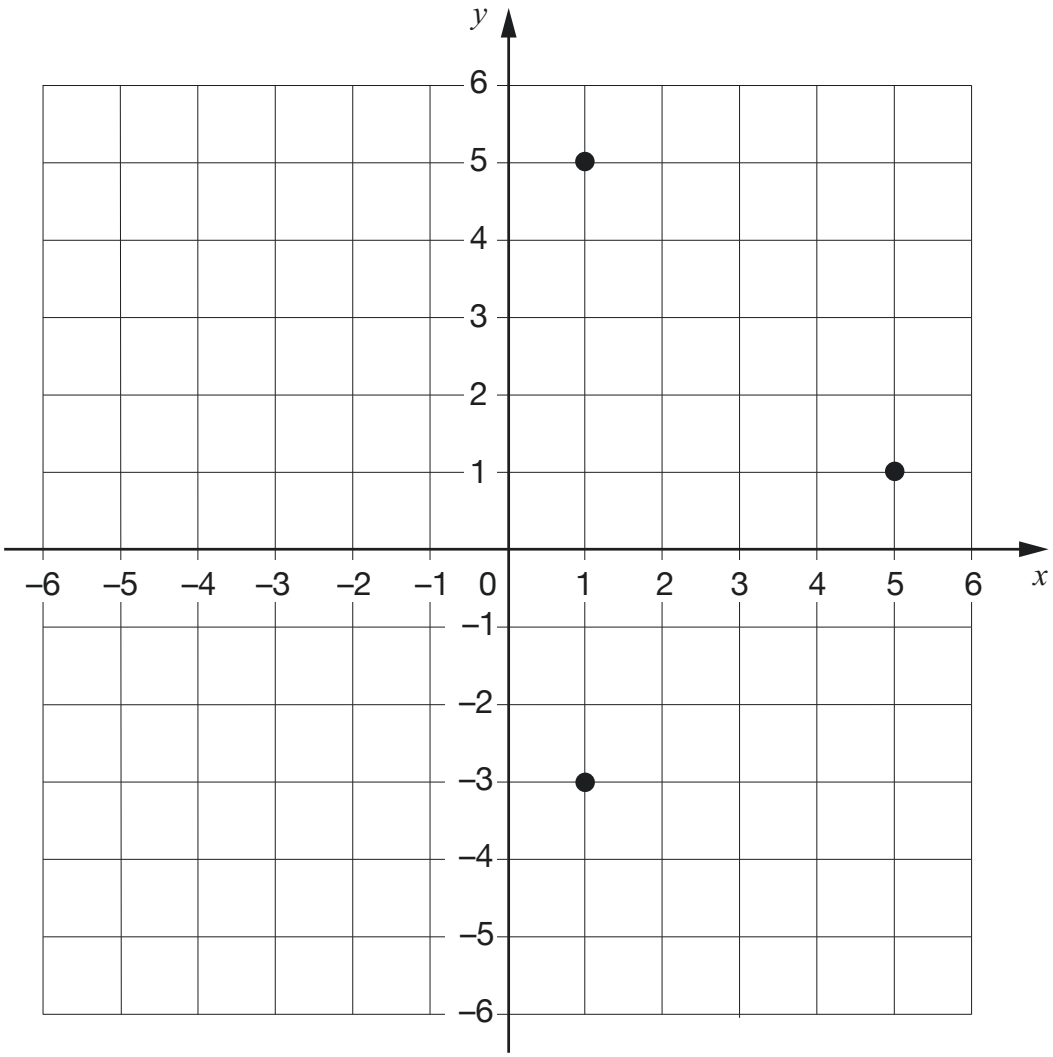
How **wide** is her model?

cm

1 mark

10 Layla draws a **square** on this coordinate grid.

Three of the vertices are marked.



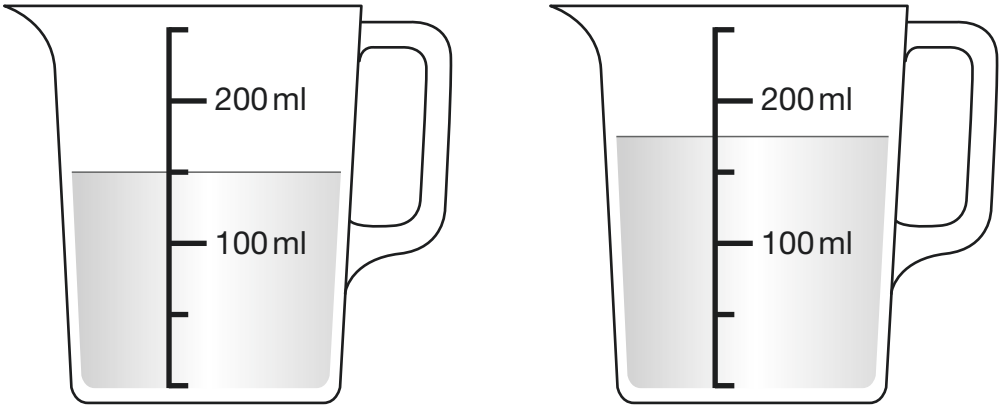
What are the coordinates of the missing vertex?

(,)

1 mark

11 Stefan has **600 millilitres** of water in a bottle.

He pours some of the water into two measuring jugs as shown.



How many millilitres of water are left in Stefan's bottle?

Show your method

ml

2 marks

12 This table shows the areas of the United Kingdom and Jamaica.

Country	Area (square kilometres)
United Kingdom	240,000
Jamaica	10,000

The area of the United Kingdom is larger than the area of Jamaica.

How many times larger is the United Kingdom?

times larger

1 mark

13 A box contains 2.6 kg of washing powder.

Jack uses 65 grams of powder for each wash.

He uses all the powder.

How many washes did Jack do?

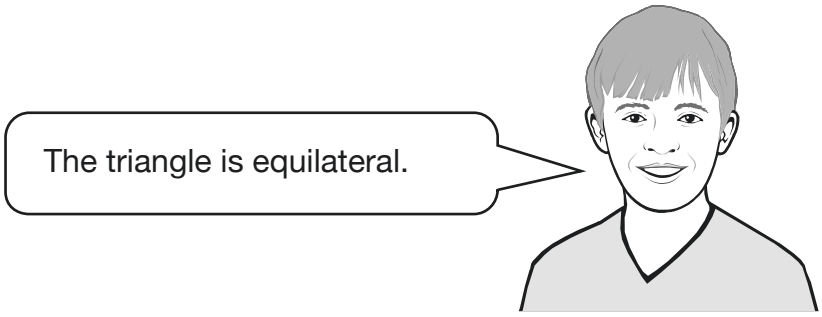
Show your method

washes

2 marks

14 Two of the angles in a triangle are 70° and 40°

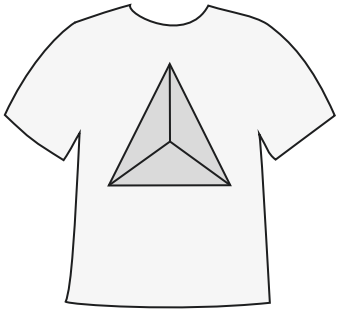
Jack says,



Explain why Jack is **not** correct.

1 mark

15 A shop prints designs on T-shirts.



They use this formula to work out the price for printing a design.

price = 60p × number of colours + £1.25

What is the price for printing a design that has **3** colours in it?

£

1 mark

Amina has **£5** to spend on printing a design.

What is the greatest number of **colours** she can have in the design?

Show your method

colours

2 marks

16 A book has 276 pages.

Amina has read $\frac{1}{3}$ of the book.

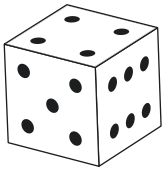
How many pages are **left** for Amina to read?

Show your method

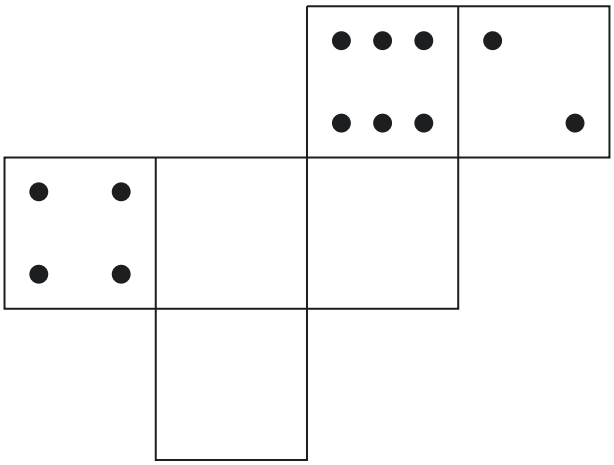
pages

2 marks

17 On a dice, the sum of the dots on opposite faces is always 7



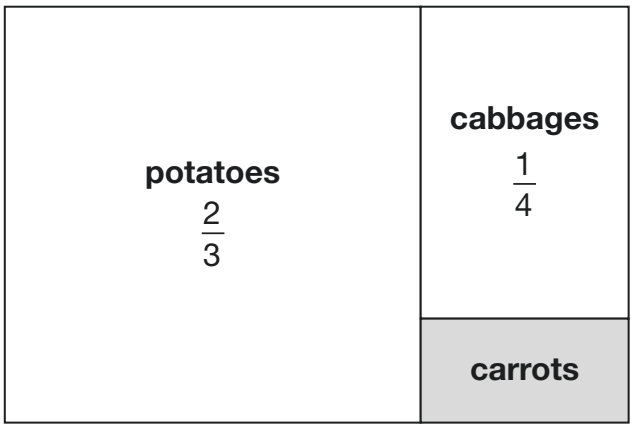
Draw dots on the three empty faces of the net so that it could fold up to make a dice.



1 mark

18 This is a diagram of a vegetable garden.

It shows the fractions of the garden planted with potatoes and cabbages.



Not to scale

The remaining area is planted with carrots.

What **fraction** of the garden is planted with carrots?

Show your method

2 marks

19

$$33{,}630 = 354 \times 95$$

Use this multiplication to complete the calculations below.

$354 \times 9.5 =$ ☐

$3{,}540 \times 95 =$ ☐

$3{,}363 \div 95 =$ ☐

2 marks

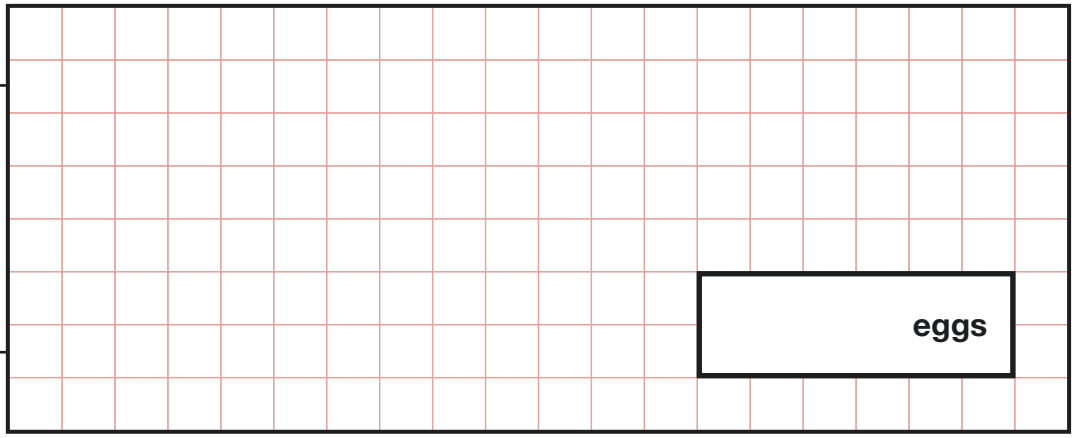
20 In March, Ken collects 2, 3 or 4 eggs each day from his hens.

In the first 20 days, Ken collects 57 eggs altogether.

There are 31 days in March.

What is the **greatest** number of eggs Ken can collect in March?

Show your method



2 marks

21 Jack finished a sponsored run in 53 minutes 25 seconds.

Ally finished 3 minutes 50 seconds **after** Jack.

How long did Ally take?

	min	sec

1 mark

Layla finished the run 8 minutes 45 seconds **before** Jack.

How long did Layla take?

	min	sec

1 mark

Standards & Testing Agency

2018 key stage 2 mathematics
Paper 3: reasoning
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2019 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						

H 0 0 0 7 0 A 0 1 2 4

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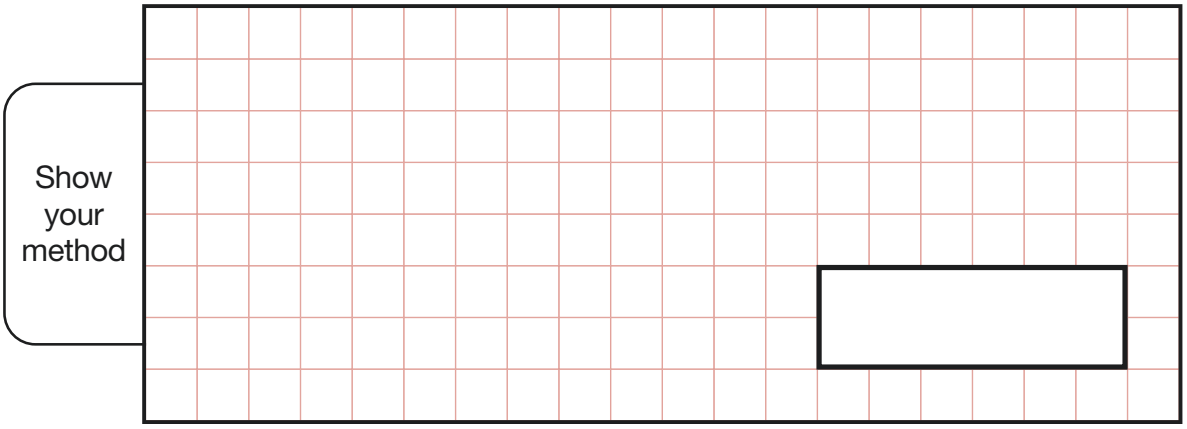

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Marks

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1 In this grid, there are four multiplications.

Write the **three** missing numbers.

4	×	8	=	
×		×		
3	×		=	21
=		=		
		56		

1 mark

2 What number is 1,000 **less** than 9,072?

1 mark

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

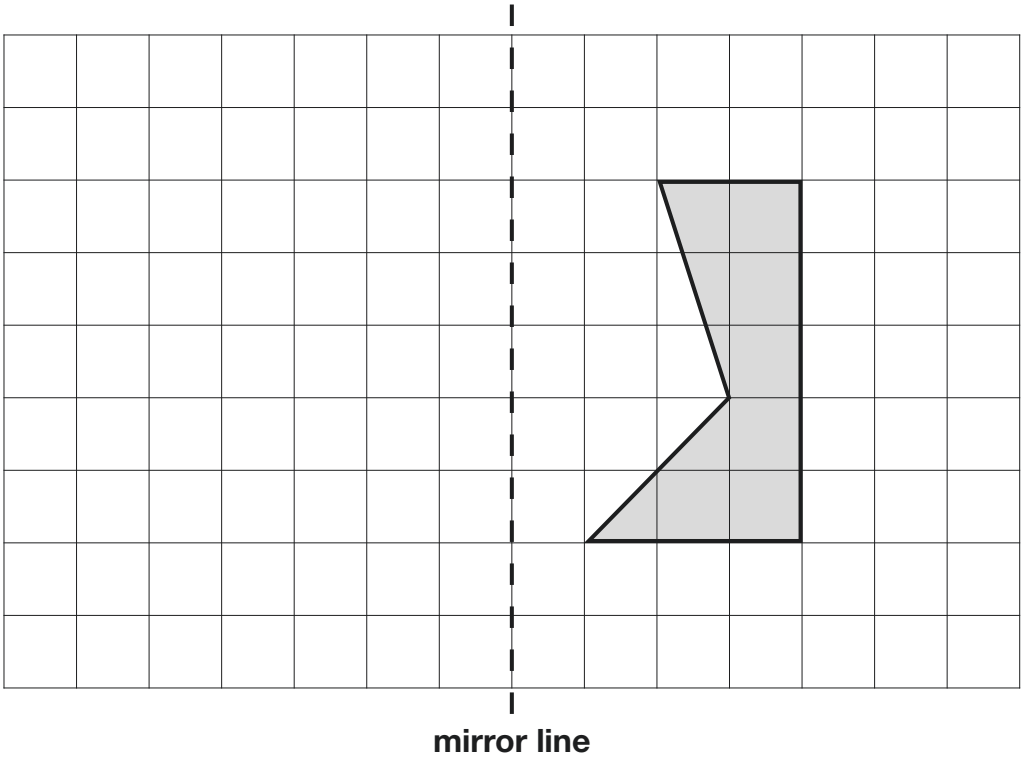
1,009,909	1st	largest
1,023,065	2nd	
1,009,099	3rd	
1,230,650	4th	smallest

1 mark

4 Here is a shaded shape on a square grid.

Reflect the shape in the mirror line.

Use a ruler.



1 mark

5 The numbers in this sequence **increase** by 45 each time.

Write the missing numbers.

$\square$ 155 200 245 $\square$ $\square$

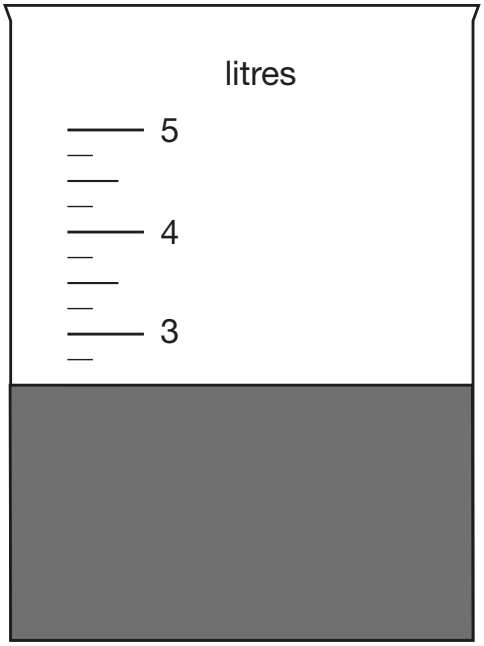
2 marks

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

$0.3 \div \square = 0.03$

1 mark

7 Jack pours some dark paint into a container.



In litres, how much paint is in the container?

litres

1 mark

8 In this sequence, the rule to get the next number is

Multiply by 2, and then add 3

Write the missing numbers.

1 mark

	25	53	

1 mark

9 Jack chose a number.

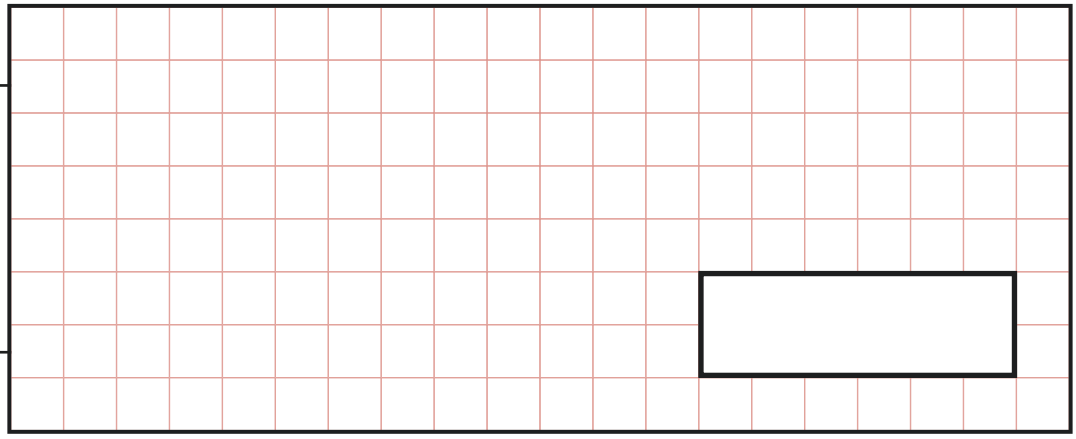
He multiplied the number by 7

Then he added 85

His answer was 953

What number did Jack choose?

Show your method



2 marks

10 A theme park sells tickets online.

Each ticket costs £24

There is a £3 charge for buying tickets.

Which of these shows how to calculate the total cost, in pounds?

Tick **one**.

number of tickets × 3 + 24 ☐

number of tickets × 24 + 3 ☐

number of tickets + 3 × 24 ☐

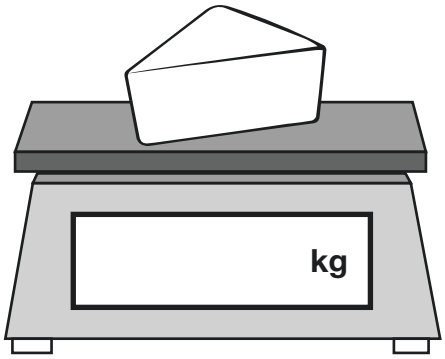
number of tickets + 24 × 3 ☐

1 mark

11 Amina is shopping.

She says,

Write one-quarter on the scales as a decimal.



1 mark

The cheese costs £1.35

Amina pays with a £2 coin.

How much change should Amina get?

1 mark

12 Here are three symbols.

$<$ $>$ $=$

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

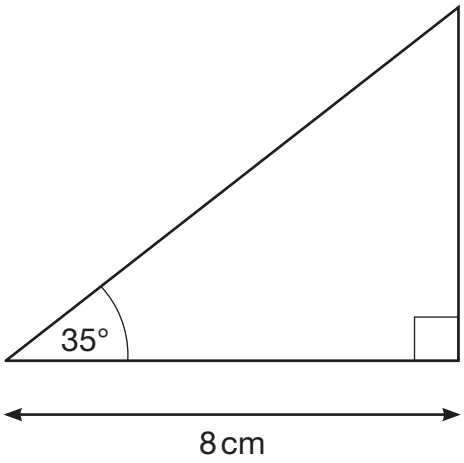
$\frac{7}{10}$ ☐ 0.07

$\frac{23}{1000}$ ☐ 0.23

1 mark

13 Here is a sketch of a triangle.

It is not drawn to scale.



Not to scale

Draw the full-size triangle **accurately** below.

Use an angle measurer (protractor) and a ruler.

One line has been drawn for you.

8 cm

2 marks

14 Complete the table.

	Round 39,476
to the nearest 10,000	
to the nearest 1,000	
to the nearest 100	

2 marks

15 Amina asked 60 children to choose their favourite flavour of jelly.

These were her results.

Flavour	Number of children
Raspberry	12
Lemon	8
Orange	15
Blackcurrant	25
Total	**60**

What **percentage** of the 60 children chose orange?

%

1 mark

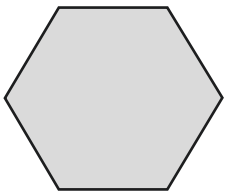
16 Write the missing number.

$$6 + 2 \times 2 - \square = 6$$

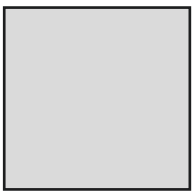
1 mark

17 These two shapes have the **same** perimeter.

regular hexagon



square



Not actual size

The length of each side of the **hexagon** is **8** centimetres.

Calculate the **area** of the **square**.

Show your method

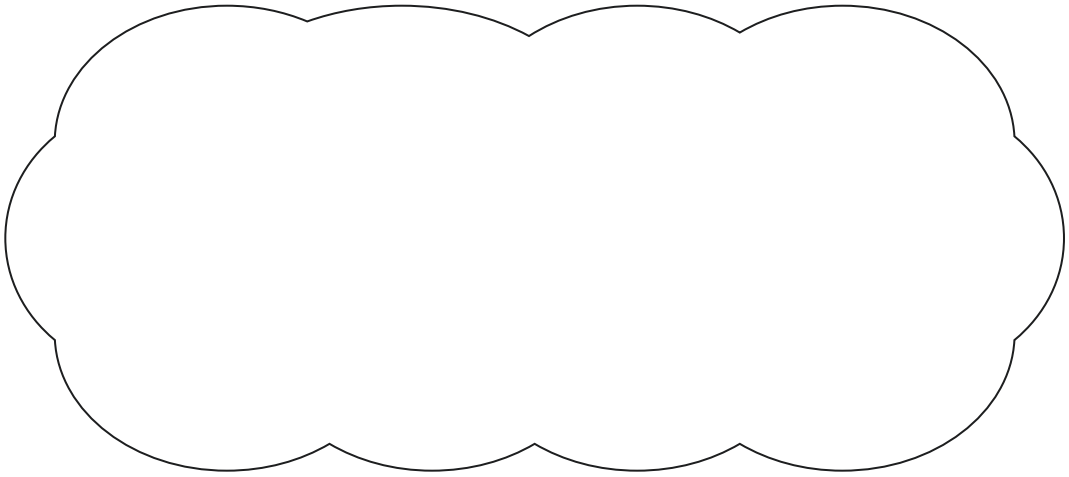
cm^2

2 marks

18 Circle the **prime** number.

95 89 87

Explain how you know the other numbers are **not** prime.

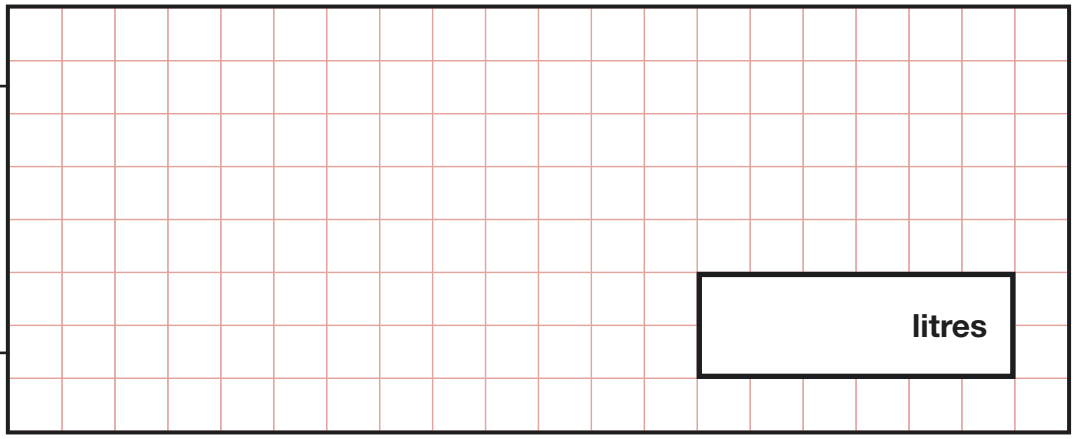


1 mark

19 A machine pours 250 millilitres of juice every 4 seconds.

How many **litres** of juice does the machine pour every **minute**?

Show your method



2 marks

20 Tick the fractions that are **equal** to 20%.

$\frac{1}{20}$ ☐

$\frac{20}{40}$ ☐

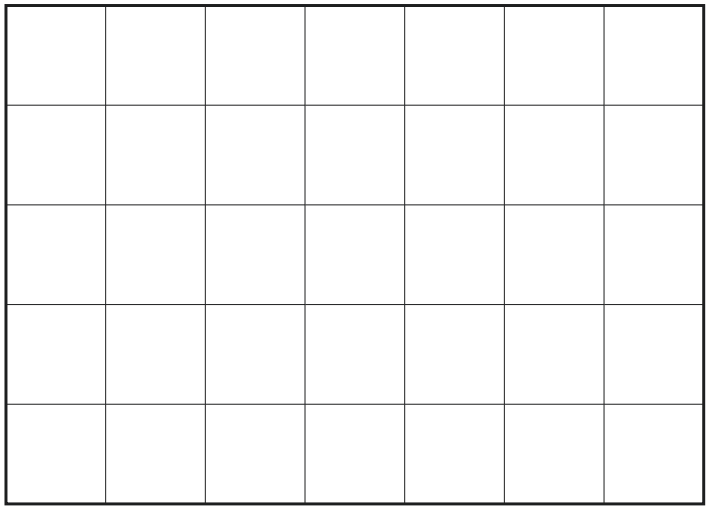
$\frac{1}{5}$ ☐

$\frac{3}{15}$ ☐

$\frac{2}{100}$ ☐

2 marks

21 Adam has this rectangular piece of card. It is marked with grid lines.



1 mark

Adam makes two straight cuts along the grid lines.

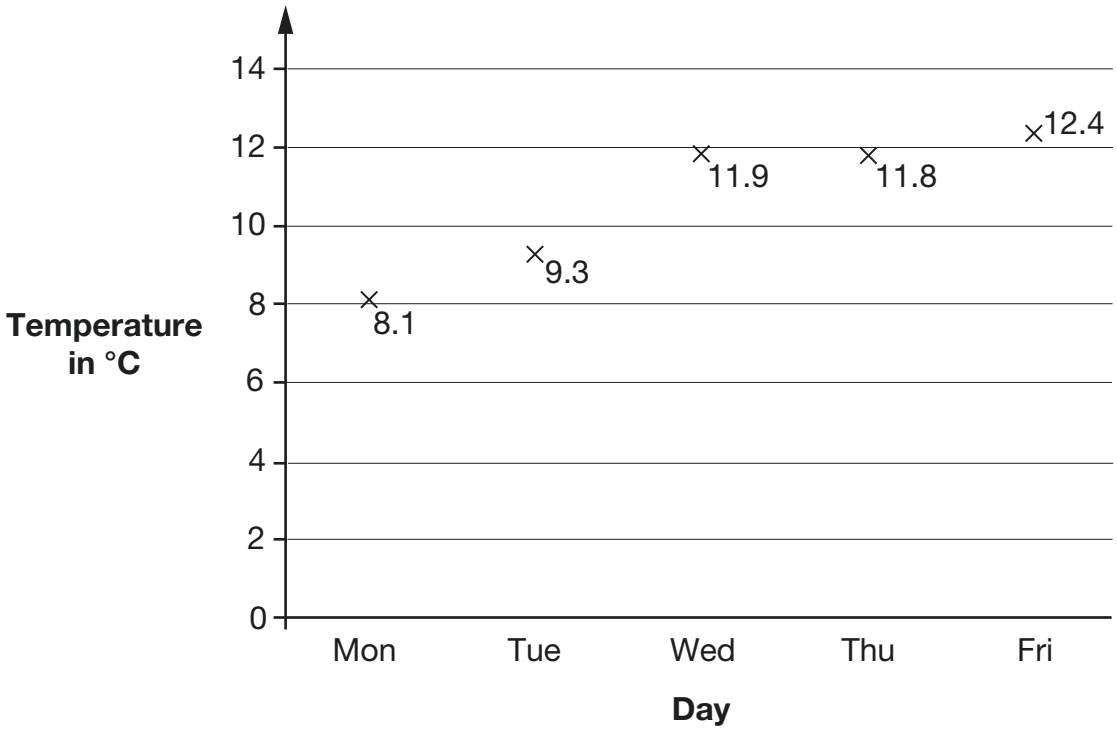
The two cuts divide the rectangle into 3 shapes:

- 2 squares of **different** size, and
- 1 rectangle.

Using the grid lines, draw **two** lines that show where Adam could have made his cuts.

Use a ruler.

22 This graph shows the maximum temperature for five days.



For what fraction of the five days was the maximum temperature below 10 °C?

1 mark

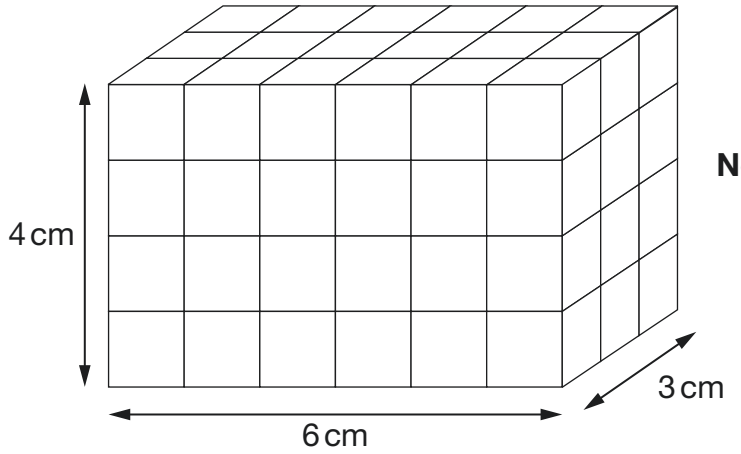
What was the **mean** maximum temperature, to one decimal place?

Show your method

°C

2 marks

23 Amina made this cuboid using centimetre cubes.



Not actual size

Stefan makes a cuboid that is 5 cm longer, 5 cm taller and 5 cm wider than Amina's cuboid.

What is the **difference** between the number of cubes in Amina's and Stefan's cuboids?

Show your method

cubes

2 marks

[END OF TEST]

Please do not write on this page.

Standards & Testing Agency

2019 key stage 2 mathematics
Paper 2: reasoning
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H 0 0 0 7 0 A 0 2 4 2 4

2019 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						

H 0 0 0 8 0 A 0 1 2 4

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Instructions

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Questions and answers

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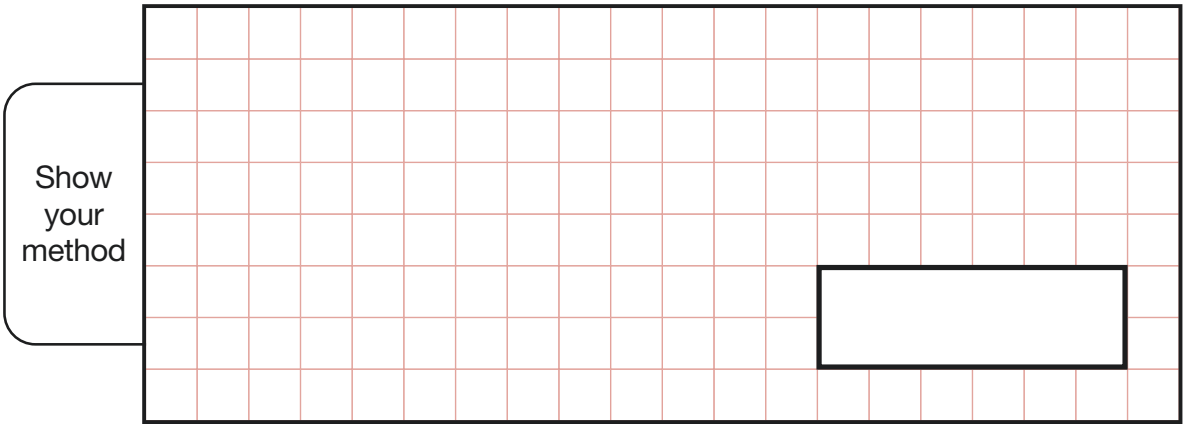

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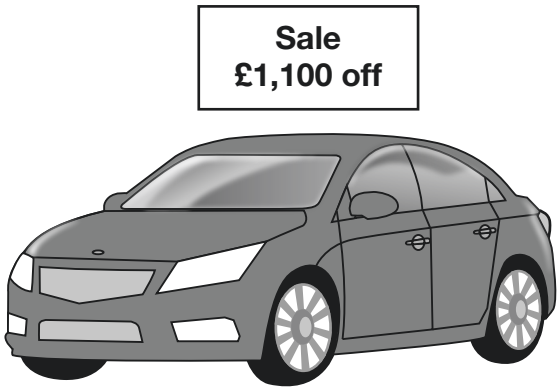
You can come back to it later, if you have time.

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 The **original** price of this car is £8,999



What is the **sale** price of the car?

£

1 mark

2

3,576,219

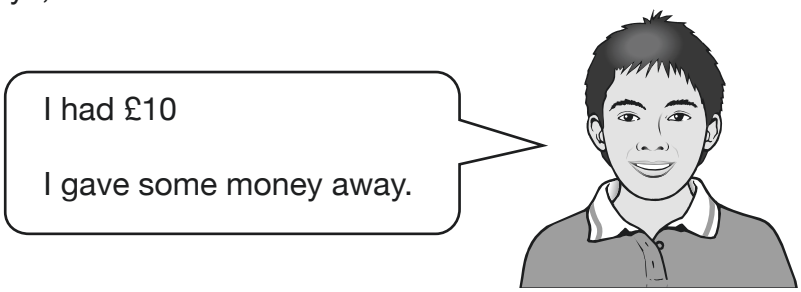
Which digit is in the **ten thousands** place?

1 mark

Round 3,576,219 to the **nearest million**.

1 mark

3 Dev says,



Which expression shows how much money Dev has left?

a is the amount of money, in pounds, that Dev gave away.

Tick **one**.

$10 + a$ ☐

$10 \div a$ ☐

$a - 10$ ☐

$10 - a$ ☐

$a \times 10$ ☐

1 mark

4 Write these masses in order, starting with the **lightest**.

1.25 kg 0.99 kg 1.025 kg 0.009 kg

kg	kg	kg	kg

lightest

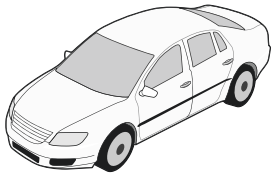
1 mark

5 Write the missing digits to make this **addition** correct.

	2		+		2	= 200

1 mark

6 John buys one toy car and one pack of stickers.



£1.49

£1.64

He pays with a **£10** note.

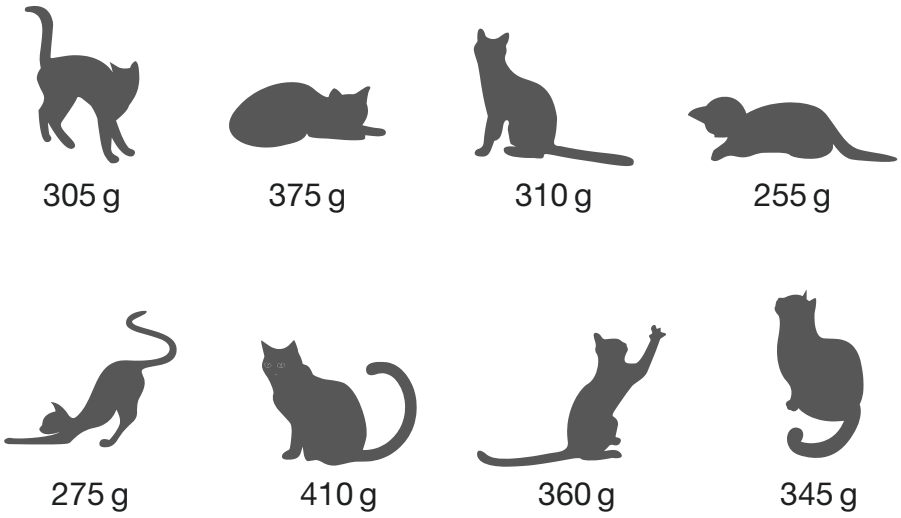
How much change does John get?

Show your method

£

2 marks

7 This picture shows the masses of eight kittens.



What is the **difference** in mass between the heaviest kitten and the lightest kitten?

g

1 mark

The masses of the kittens are to be put in four groups.

Write the missing numbers in the table.

One has been done for you.

Mass in g	Number of kittens
250–299	
300–349	
350–399	
400–449	1

1 mark

8 Ken is playing a game. He has 4,289 points.

Then he scores another 355 points.

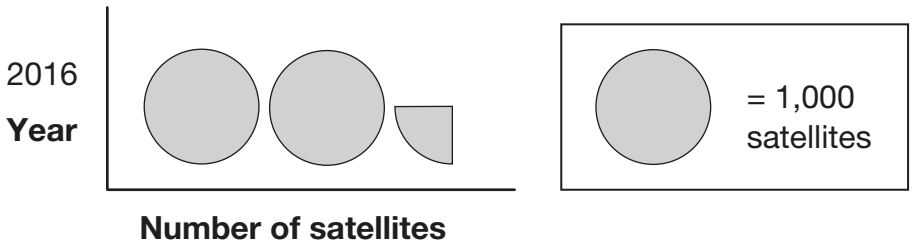
Ken's target is 6,000 points.

How many **more** points does Ken need to reach his target?

Show your method

2 marks

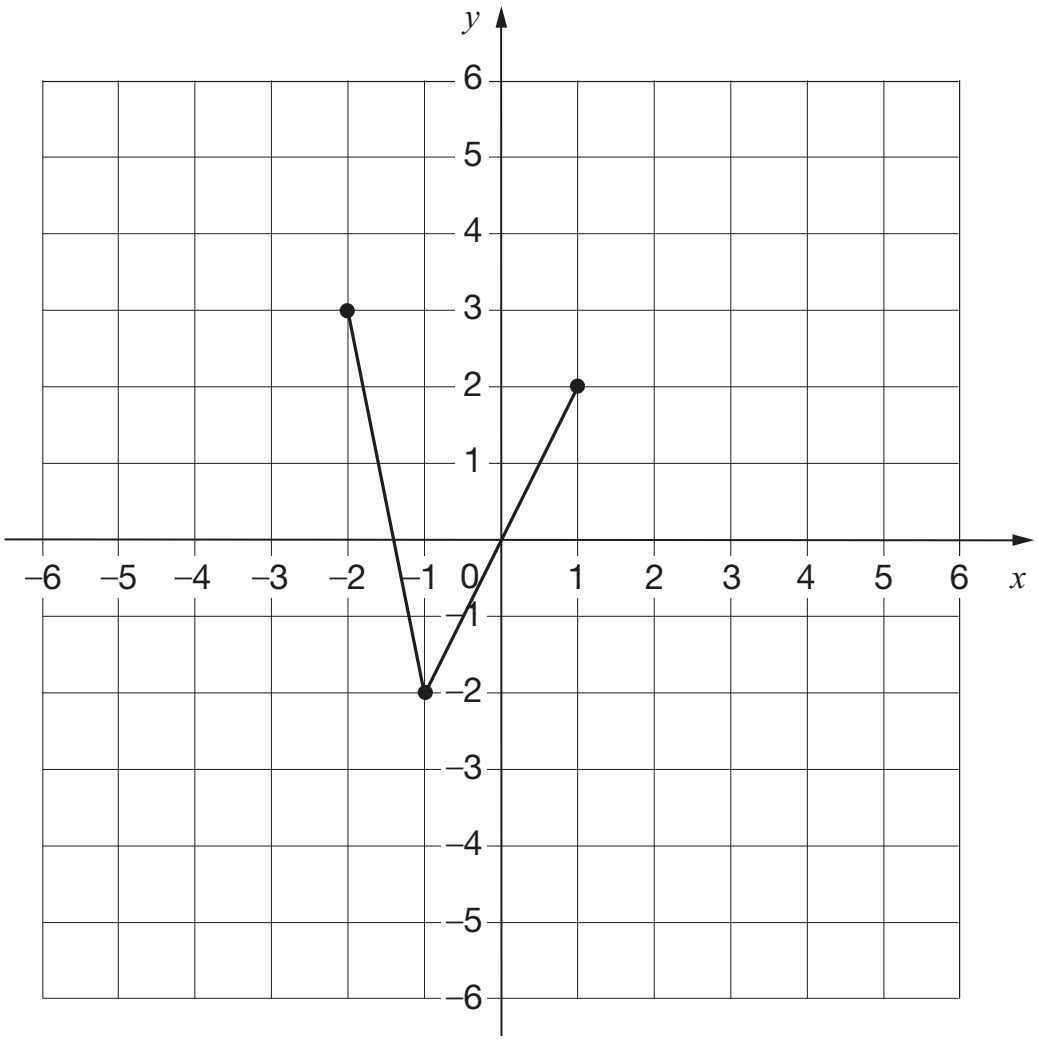
9 This pictogram shows the number of satellites above the Earth in 2016.



How many satellites were above the Earth in 2016?

1 mark

10 On the grid there are three points joined by two lines.



Lara plots **another point** on the grid at **(–1, 2)**.

She joins the points to make a quadrilateral.

Complete Lara's quadrilateral on the grid.
Use a ruler.

1 mark

Then Lara translates the quadrilateral **4 squares to the right**.

Draw the quadrilateral in its new position on the grid.

1 mark

11 Here are five numbers.

~~2~~ 3 4 5 6

Write each number on the correct cards.

The number 2 has been written on the correct cards for you.

Prime numbers	Factors of 12	Factors of 15
2	2	

2 marks

12 Amina's bed is 190 cm in length and 91 cm in width.

She is making a **one-tenth** scale model of the bed.

What are the length and width of Amina's model?

length = ____ **cm**

width = ____ **cm**

1 mark

13

Kirsty says,

When you double the size of an acute angle, you always get an obtuse angle.

Explain why Kirsty is **not** correct.

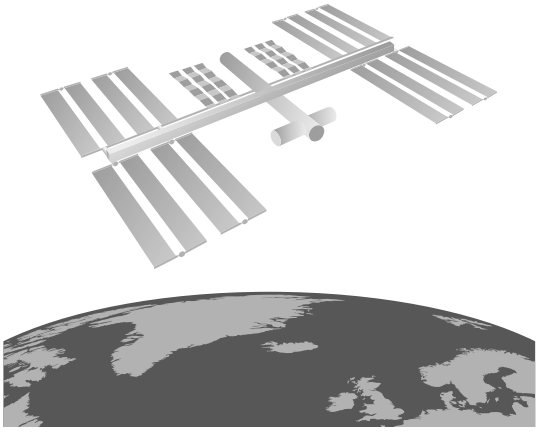
1 mark

14 How many days are there in September, October and November altogether?

days

1 mark

15



The International Space Station orbits the Earth at a height of 250 miles.

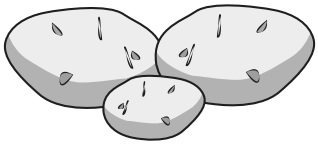
What is the height of the International Space Station in **kilometres**?

Use 8 kilometres equals 5 miles.

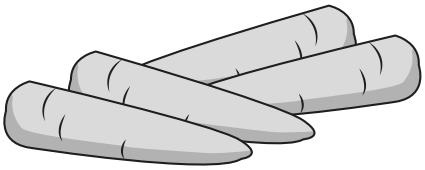
km

1 mark

16



potatoes
£1.50 per kg



carrots
£1.80 per kg

Jack buys $1\frac{1}{2}$ kg of potatoes and $\frac{1}{2}$ kg of carrots.

How much **change** does he get from **£5**?

Show your method

£

2 marks

17

$$x + 2y = 20$$

x and y are whole numbers **less than 10**

What could x and y be?

$x =$ ☐

$y =$ ☐

1 mark

18

Tick the fractions **less than** $\frac{5}{8}$

$\frac{1}{2}$ ☐

$\frac{2}{8}$ ☐

$\frac{3}{4}$ ☐

$\frac{7}{16}$ ☐

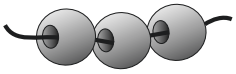
$\frac{24}{32}$ ☐

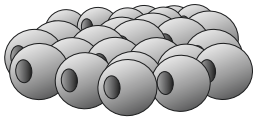
2 marks

19 Layla makes jewellery to sell at a school fair.

Each bracelet has **53** beads.

She makes **68** bracelets.





Each necklace has **105** beads.

She makes **34** necklaces.

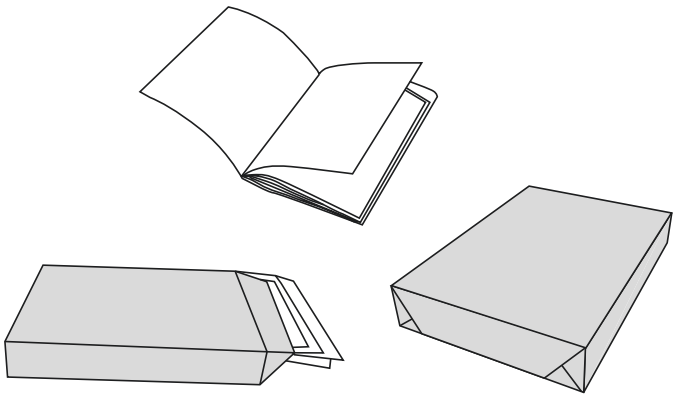
How many beads does Layla use **altogether**?

Show your method

beads

3 marks

20 Adam is making booklets.



Each booklet must have **34** sheets of paper.

He has **2** packets of paper.

There are **500** sheets of paper in each packet.

How many complete booklets can Adam make from **2** packets of paper?

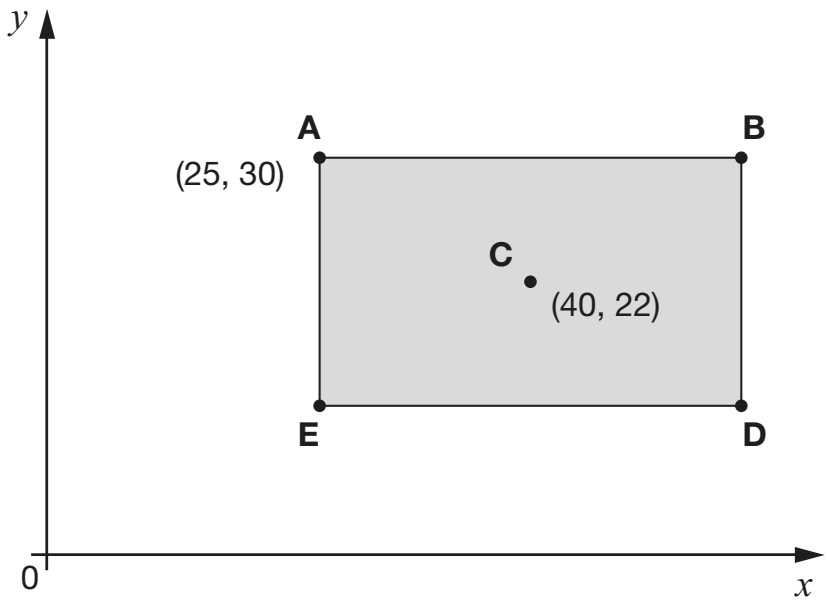
Show your method

booklets

2 marks

21 **ABDE** is a rectangle on coordinate axes.

The sides of the rectangle are parallel to the axes.



Not to scale

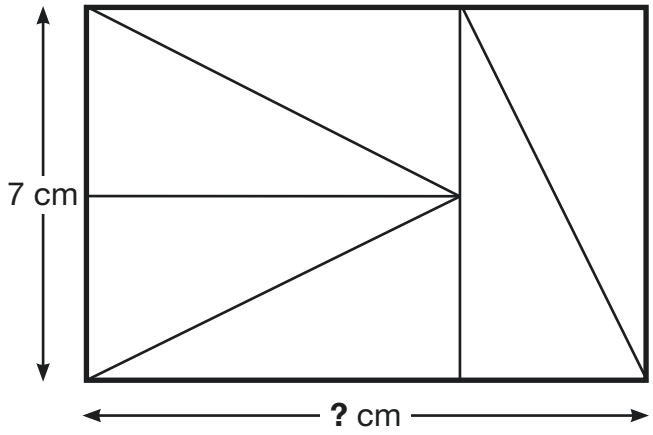
Point **C** is the centre of the rectangle.

What are the coordinates of **B** and **D**?

B is (,) 1 mark

D is (,) 1 mark

22 Six identical right-angled triangles are arranged to make a rectangle.



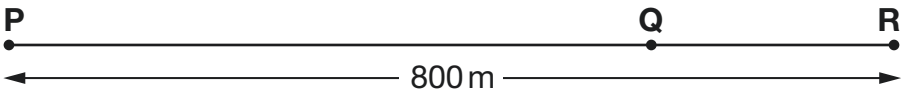
Not actual size

Calculate the **length** of the rectangle.

cm

1 mark

23

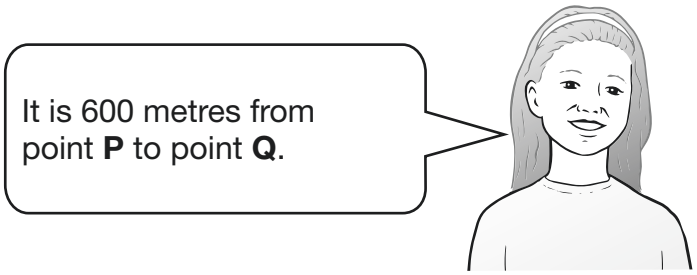


Not to scale

The distance from point **P** to point **R** is 800 metres.

The distance from point **P** to point **Q** is **4 times** the distance from point **Q** to point **R**.

Olivia says,



Explain why Olivia is **not** correct.

1 mark

[END OF TEST]

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2019 key stage 2 mathematics
Paper 3: reasoning
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2022 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						

K 0 0 0 7 0 A 0 1 2 4

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Marks

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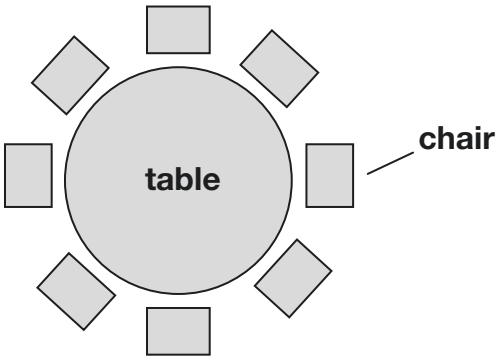
1 Circle the **greatest** number.

9,206,499 9,215,300 9,206,504

9,215,298 9,206,909

1 mark

2 One table can seat 8 people.



How many tables are needed to seat 40 people?

tables

1 mark

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

400,000 + ☐ + 70 = 430,070

1 mark

4 Children estimated the number of beans in a jar.

These were the estimates of five children.

Amir	1,310
Olivia	1,220
Emma	1,400
John	1,290
Chen	1,460

The exact number of beans in the jar was **1,380**

Whose estimate was **closest** to the exact number?

_____

1 mark

Whose estimate was **furthest** from the exact number?

_____

1 mark

5 One tonne is 1,000 kilograms.

A truck can carry a load of 2.3 tonnes.

How many **kilograms** can the truck carry?

kg

1 mark

6 Emma has a 5 litre bag of compost.

She uses 2.75 litres.

How much compost does Emma have left?

litres

1 mark

7 In a race, Ali completes a swim, a run and a bicycle ride.

The swim is $\frac{1}{10}$ of the total distance.

The run is $\frac{3}{10}$ of the total distance.

What fraction of the total distance is the **bicycle ride**?

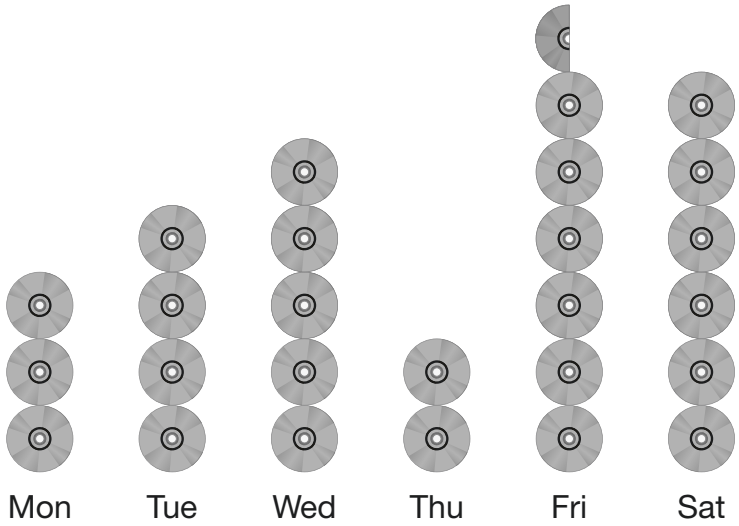
1 mark

8 Circle the improper fraction that is equivalent to $2\frac{3}{8}$

$\frac{5}{8}$ $\frac{14}{8}$ $\frac{19}{8}$ $\frac{23}{8}$ $\frac{26}{8}$

1 mark

9 This pictogram shows how many DVDs a shop sells in one week.



On **Monday**, 24 DVDs were sold.

How many DVDs were sold on **Friday**?

1 mark

10 A shop has an offer.

Buy one box for £1.90

Get the second box half price.

Ali buys two boxes of cereal.

How much must he pay **altogether**?

Show your method

£

2 marks

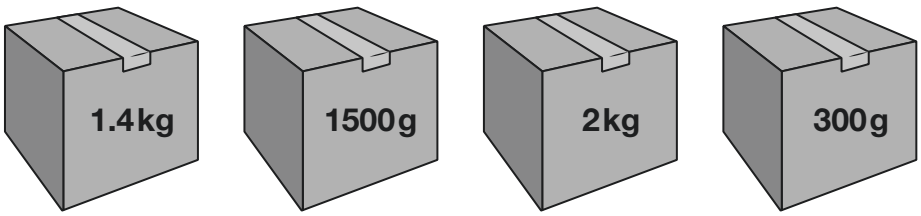
11 Write the missing values.

$$\frac{3}{10} = \frac{\square}{20}$$

$$\frac{12}{15} = \frac{4}{\square}$$

1 mark

12 William has four parcels.

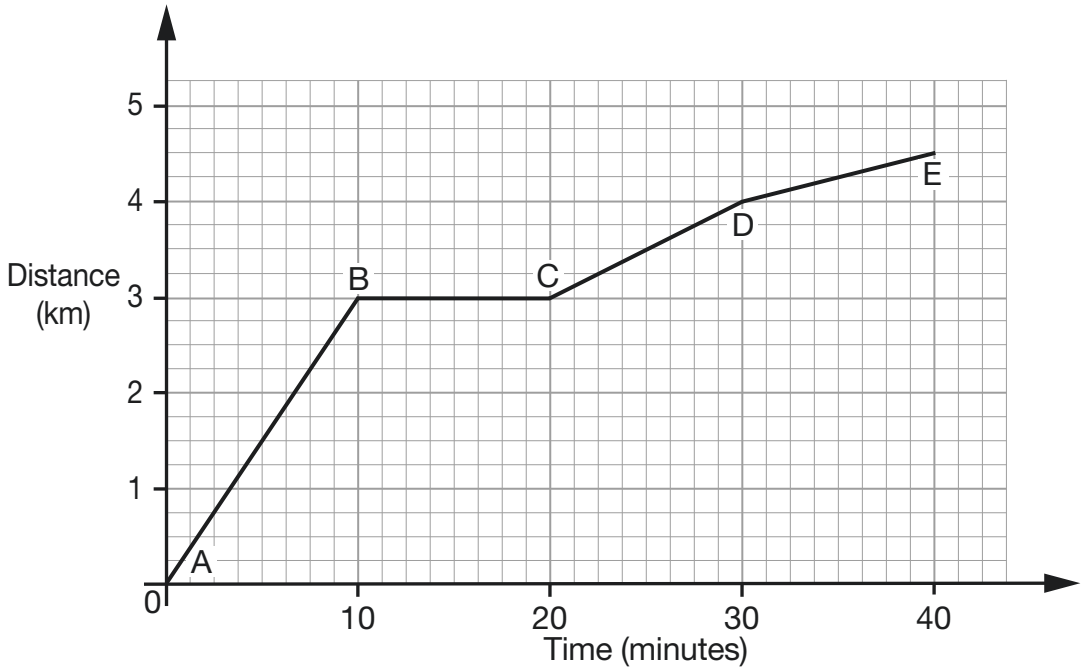


Write the masses in order, starting with the **heaviest**.

heaviest

1 mark

13 Look at the graph below that shows Dev's bike ride.



Match each part of Dev's journey to the correct sentence.

A to B	Dev rests for 10 minutes.
B to C	Dev cycles 1 km in 10 minutes.
C to D	Dev cycles 3 km in 10 minutes.
D to E	Dev cycles less than 1 km in 10 minutes.

1 mark

14 This 850 ml bottle of squash makes 17 drinks.

How many millilitres of squash are in each drink?

ml

1 mark

15 Write the correct sign =, > or < in each box.

$1 \times 2 \times 3 \quad \square \quad 1 + 2 + 3$

$2 \times 2 \times 2 \quad \square \quad 2 + 2 + 2$

$1 \times 10 \times 10 \quad \square \quad 1 + 10 + 10$

$0 \times 10 \times 10 \quad \square \quad 0 + 10 + 10$

2 marks

16 Tick the numbers that round to 28.7

28.07 ☐

28.65 ☐

28.71 ☐

28.75 ☐

28.97 ☐

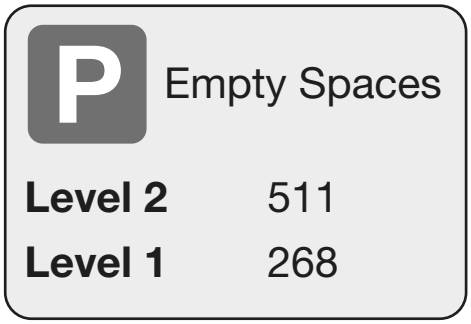
1 mark

17 6 divides into 40 with a remainder of 4

Write **one** other number that divides into 40 with a remainder of 4

1 mark

18 This sign shows the number of **empty spaces** on each level of a car park at 10 am.



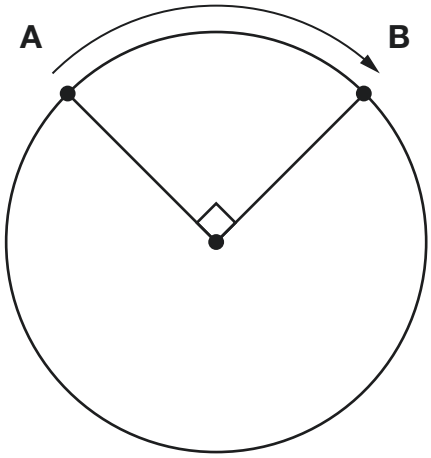
In this car park, **each** level has 800 spaces.

What is the total number of cars **parked** in the car park at 10 am?

Show your method

2 marks

19 The **circumference** of this circle is 60 centimetres.



Not actual size

What is the distance around the edge of the circle from **A** to **B**?

cm

1 mark

20 There are 432 places at a dance school.

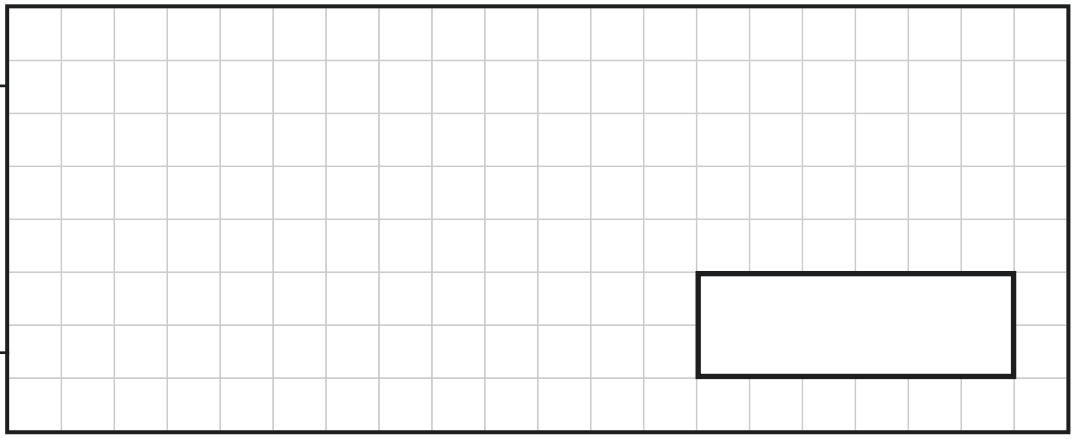
There are two age groups.

This table shows the number of classes and the number of pupils in each class for each age group at the moment.

Age in years	Number of classes	Number of pupils in each class
7–12	15	16
13–18	10	18

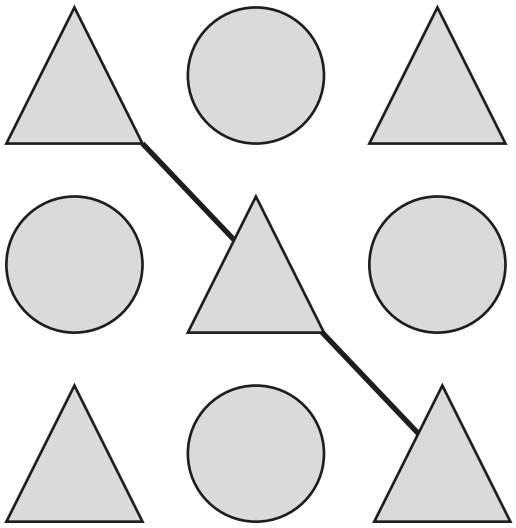
How many **more** pupils can join the dance school?

Show your method



2 marks

21

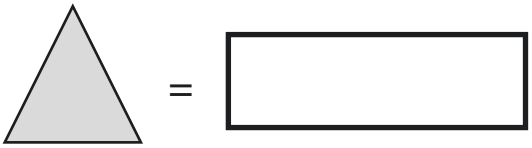


Each shape stands for a number.

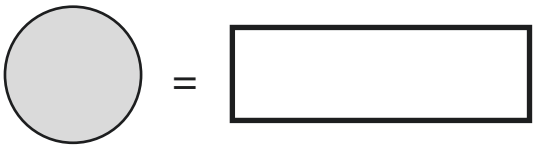
The total of the shapes on the diagonal line is 48

The total of all the shapes is 200

Calculate the value of each shape.



1 mark



1 mark

22 You can make green paint by mixing:

- 250 ml of blue paint
- 1,150 ml of yellow paint.

Stefan wants to make some of this green paint.

He uses 750 ml of **blue** paint.

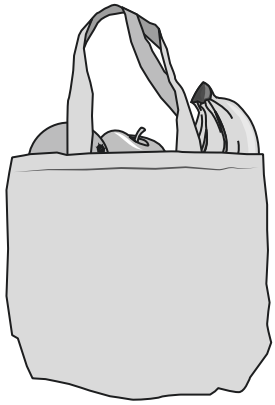
How much **green** paint does he make?

Show your method

ml

2 marks

23 Adam has a bag of fruit that weighs **1.25 kilograms**.



He takes out a banana. Now the bag of fruit weighs **1.1 kg**.

Next, he takes out an orange. Now the bag weighs **920 g**.

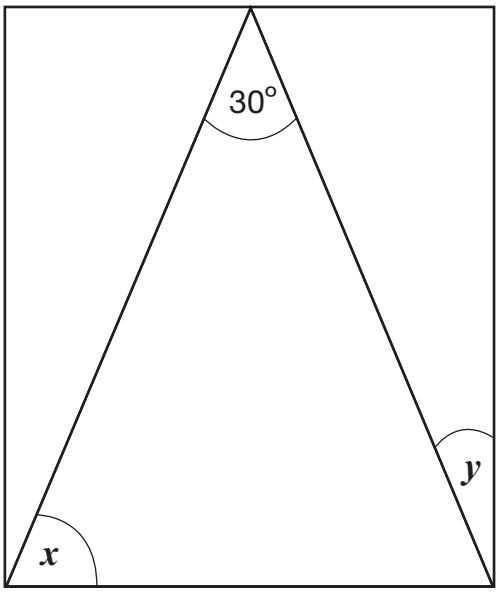
How much **more** does the orange weigh than the banana?

Show your method

g

2 marks

24 Here is an **isosceles** triangle inside a rectangle.



Not to scale

Calculate the sizes of angles x and y.

Show your method

x = °

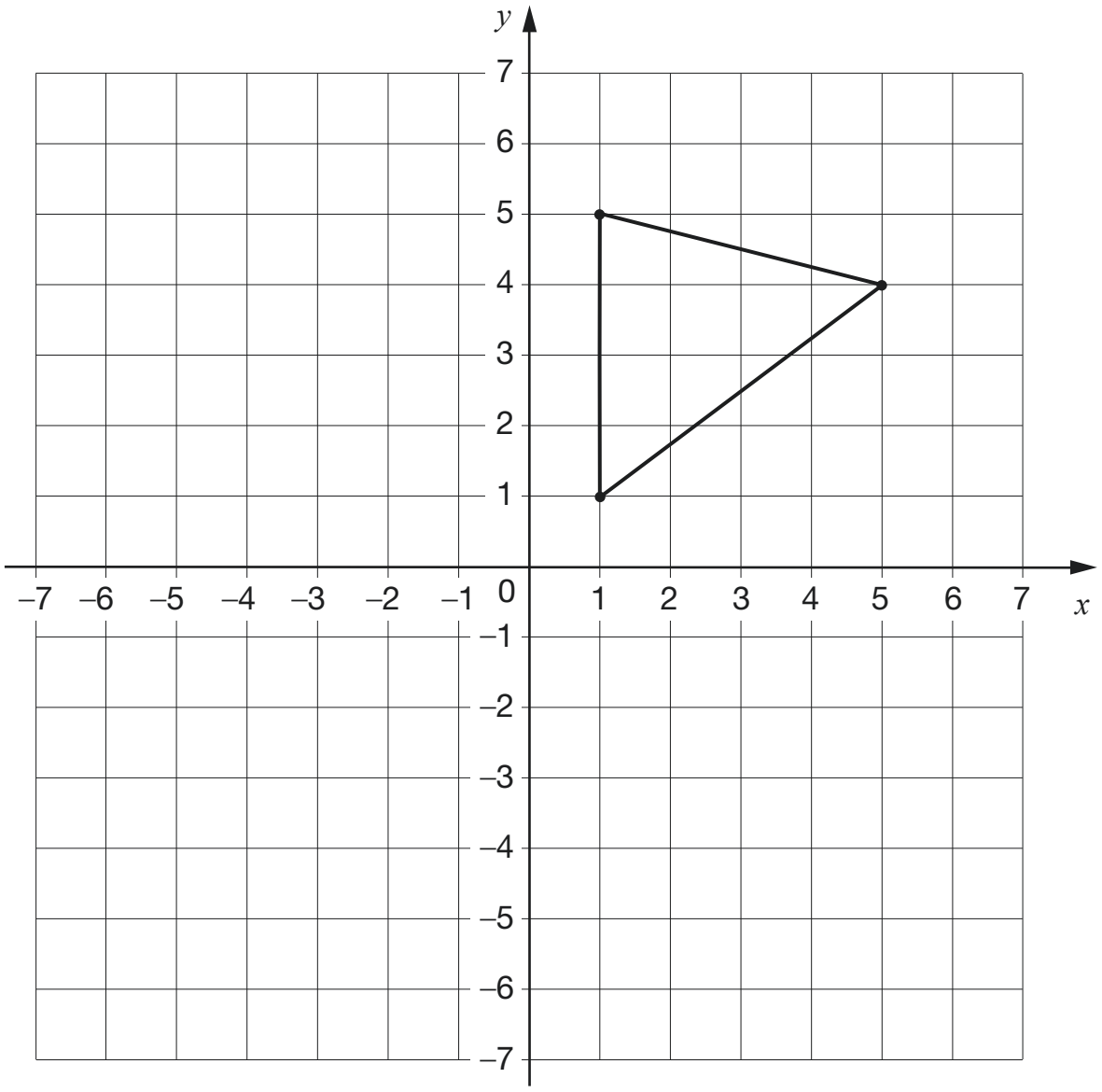
y = °

2 marks

25 The triangle is to be transformed on the grid as follows:

- First translate the shape 7 units down.
- Then reflect the **resulting** triangle in the y-axis.

Draw the new triangle on the grid after **each** transformation.



2 marks

Use a ruler.

[END OF TEST]

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2022 key stage 2 mathematics
Paper 2: reasoning
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2022 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						

K 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

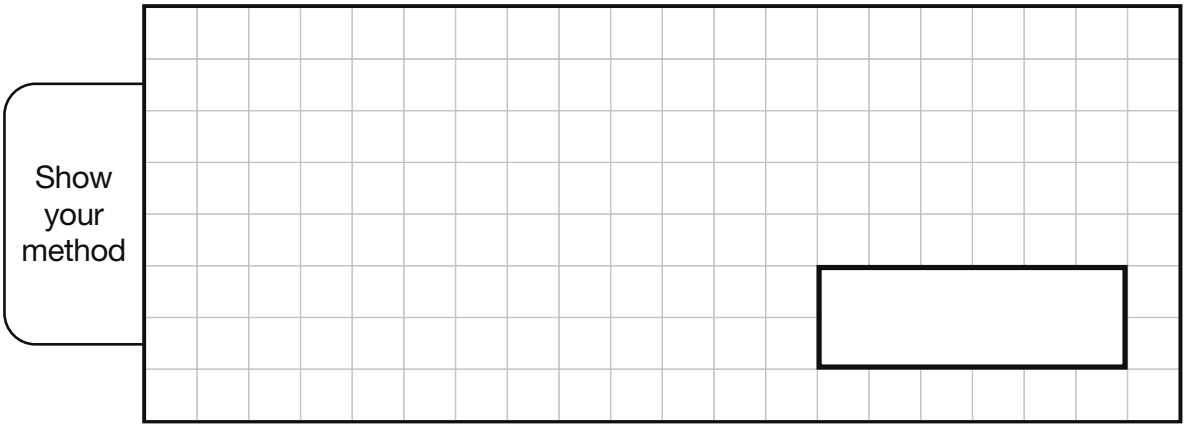
You have **40 minutes** to complete this test.

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.

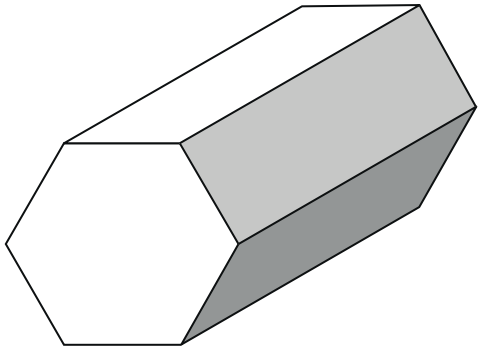
If you cannot do a question, **go on to the next one**.
You can come back to it later, if you have time.

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 number of marks available for each question.

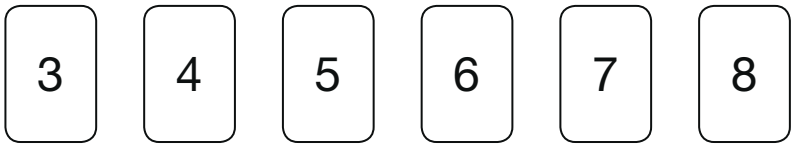
1 Here is a drawing of a hexagonal prism.



How many **faces** does the prism have?

1 mark

2 Here are six number cards.



Use **all six** cards to complete the three multiplications below.

24 = ☐ × ☐

28 = ☐ × ☐

30 = ☐ × ☐

1 mark

3 Olivia buys a banana, an apple and a bag of nuts.

30p

45p

60p

She pays with three 50p coins.

What is her change?

Show your method

p

2 marks

4 Draw **four** lines to match each fraction to its equivalent decimal.

	0.3
$\frac{1}{2}$	0.5
$\frac{3}{10}$	0.8
$\frac{3}{4}$	0.03
$\frac{3}{100}$	0.25
	0.75

2 marks

5 Some children vote for their favourite ice-cream flavour.

Ice-cream flavour	Number of children
vanilla	87
chocolate	154
strawberry	**?**
mint	38
Total	**402**

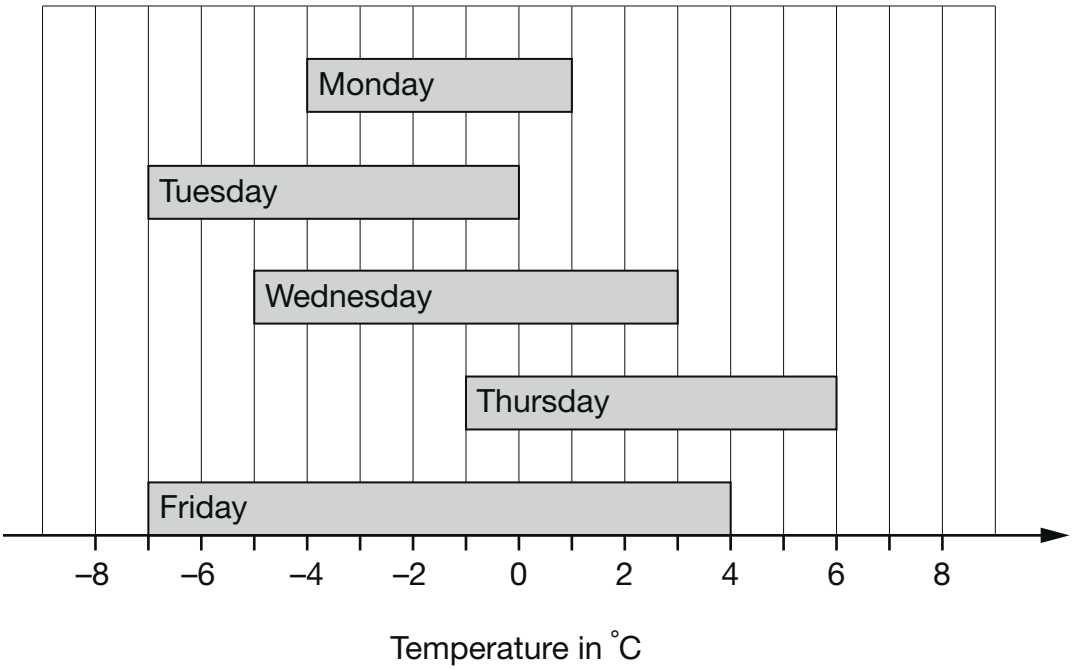
How many children vote for **strawberry**?

Show your method

children

2 marks

6 This chart shows the range of temperatures each day during one week from Monday to Friday.



What was the **lowest** temperature?

°C

1 mark

What was the difference between the highest and lowest temperatures on **Wednesday**?

°C

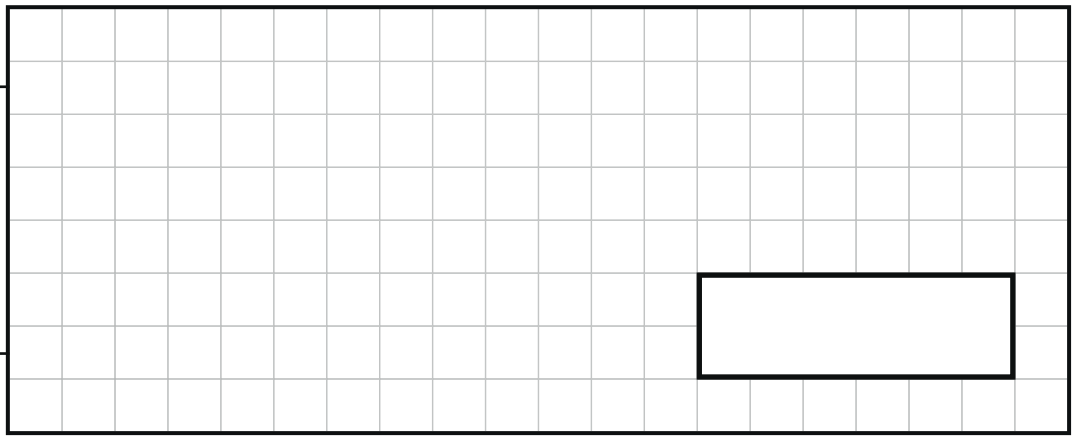
1 mark

7 One Saturday afternoon, a total of 234,869 people attended three rugby matches.

- 80,978 people attended match 1
- 72,319 people attended match 2

How many people attended match 3?

Show your method



2 marks

8

7,546

Round this number:

to the nearest 1,000 ☐

to the nearest 100 ☐

to the nearest 10 ☐

2 marks

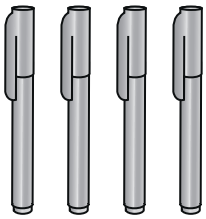
9

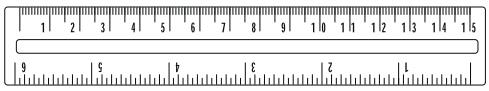
Complete the calculation.

$1{,}000 \times 416 = 10 \times$ ☐

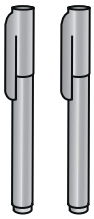
1 mark

10 Adam buys 4 pens and a ruler and pays £4.75 altogether.





Jack buys 2 pens and pays £1.98 altogether.



How much does a **ruler** cost?

Show your method

2 marks

11 Ally chooses a whole number.

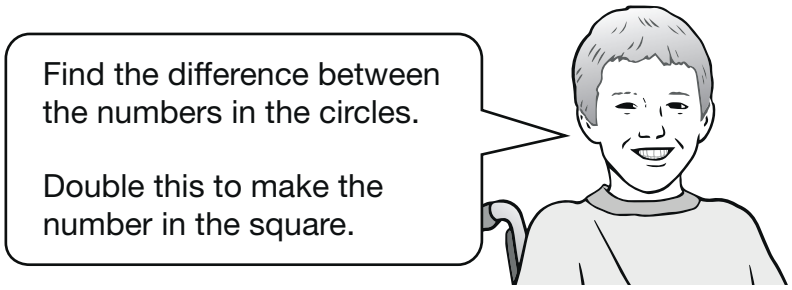
When she multiplies her number by **4**, the answer is **less than 100**

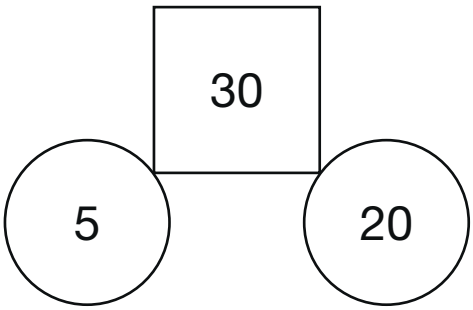
When she multiplies her number by **5**, the answer is **greater than 100**

Write a number that Ally could have started with.

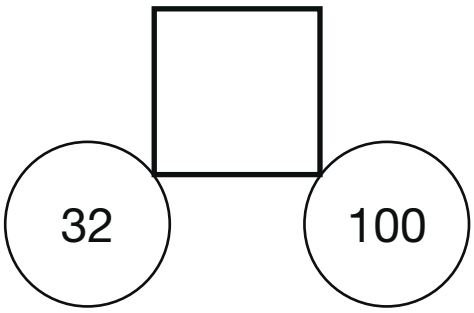
1 mark

12 William says the rule for this diagram.

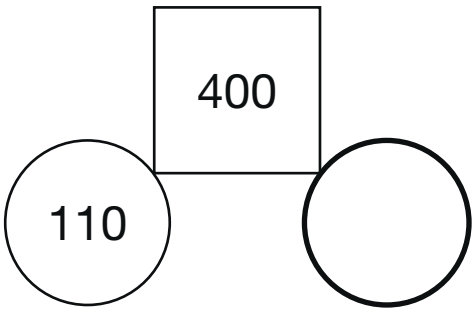




Use the same rule to write the missing numbers below.



1 mark



1 mark

13 Write the missing fraction to make this **addition** correct.

$$\frac{2}{3} + \square = \frac{5}{6}$$

1 mark

14 Jack hires a hall for a party.

This formula is used to work out the total cost.

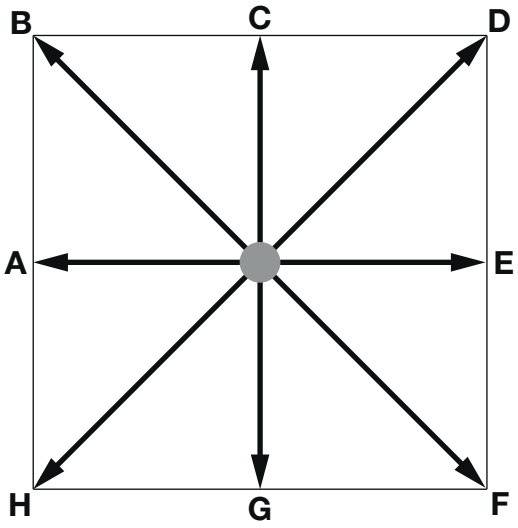
Total cost = £15 booking fee + £12.50 per hour

What is the total cost of hiring the hall from 6 pm until 11 pm?

£

1 mark

15 Stefan stands in the centre of this square.



Not actual size

Stefan is facing towards **F**.

He turns **anti-clockwise** to face **D**.

What **angle** does Stefan turn through?

degrees

1 mark

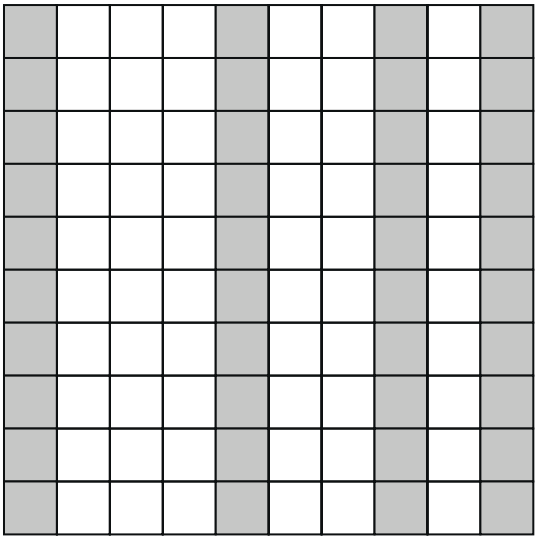
Stefan is now facing towards **D**.

He turns **3 right angles clockwise**.

Write the **letter** he faces after the turn.

1 mark

16 Part of this 10 × 10 grid is shaded.



Tick the fractions that represent the shaded part of the grid.

$\frac{1}{4}$ ☐

$\frac{2}{5}$ ☐

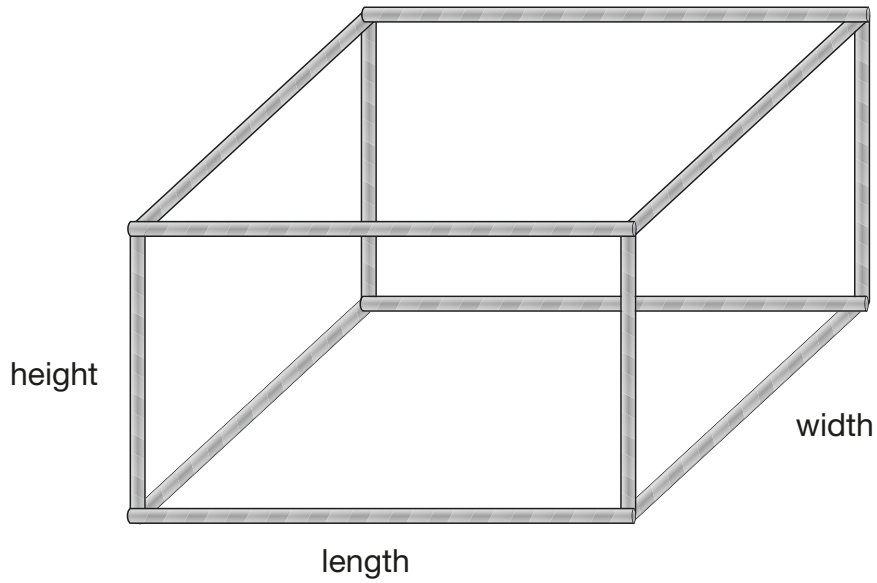
$\frac{4}{10}$ ☐

$\frac{6}{10}$ ☐

$\frac{40}{100}$ ☐

2 marks

17 Kim makes a cuboid model using straws.



She uses straws that are 7.5 cm long for the height.

She uses straws that are 11 cm long for the length.

She uses straws that are 8.5 cm long for the width.

What is the **total** length of all the straws in her model?

Show your method

cm

2 marks

18

The **full price** of a T-shirt is £15

The price is reduced by 30%.

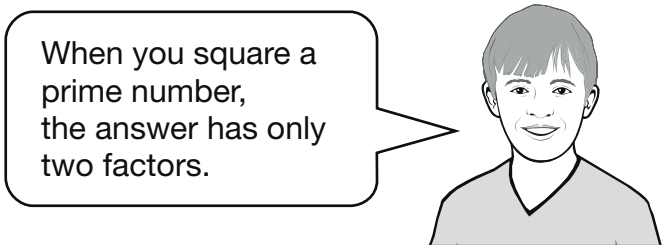
What is the **reduced price**?

Show your method

£

2 marks

19 Jack says,



Explain why Jack is **not** correct.

1 mark

20 This table shows how many people finished the New York Marathon in each of the first four decades it was held.

New York Marathon	
Decade	**Total number of people who finished**
1st decade	24,863
2nd decade	170,932
3rd decade	282,420
4th decade	350,824

What is the mean number of people who finished the marathon per decade? Round your answer to the **nearest hundred**.

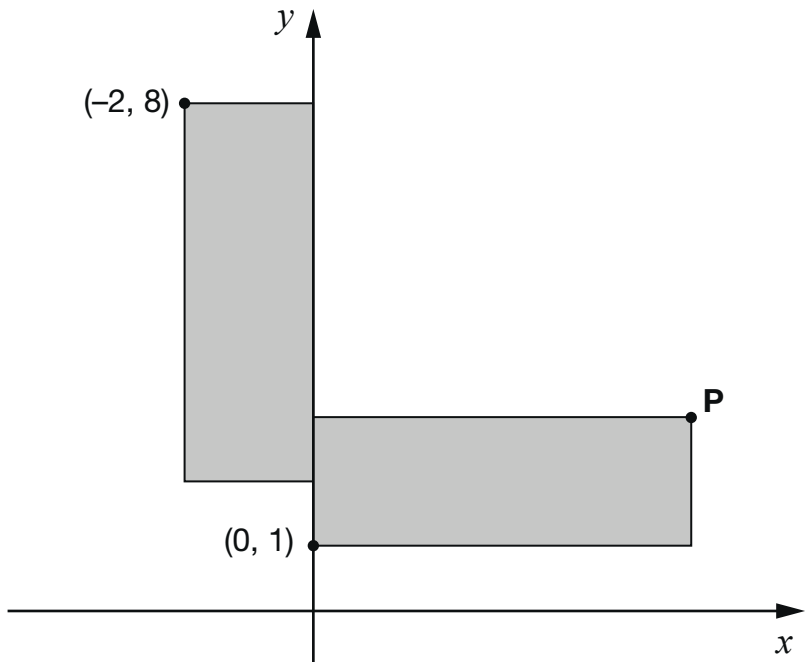
Show your method

people

3 marks

21 These two rectangles are identical.

The length of each rectangle is **three times** its width.



Not to scale

What are the coordinates of point **P**?

(,)

1 mark

[END OF TEST]

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2022 key stage 2 mathematics
Paper 3: reasoning
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