

Name



Key Stage Two

Mathematics

SATS Practice Papers

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Pack Four

Key Stage Two Mathematics



Set A Paper 1: Arithmetic

Calculator Not Allowed
30 minutes

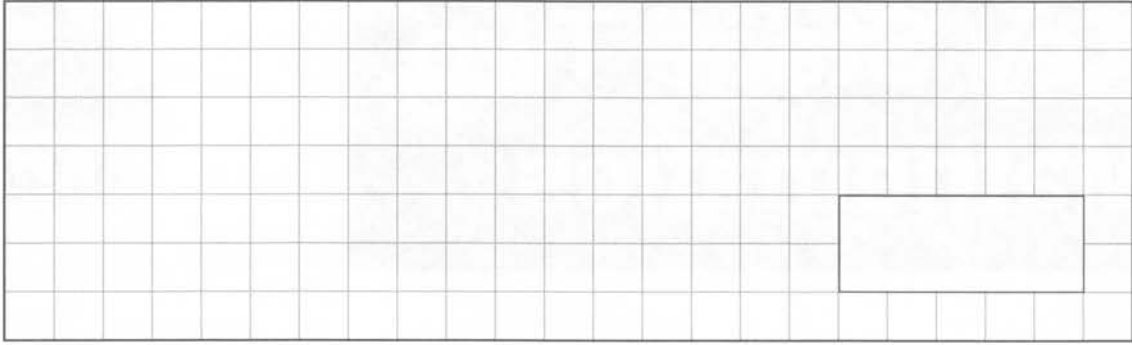
First name						
Middle name						
Last name						
School						
Date of birth	Day		Month		Year	

Total marks

--

1

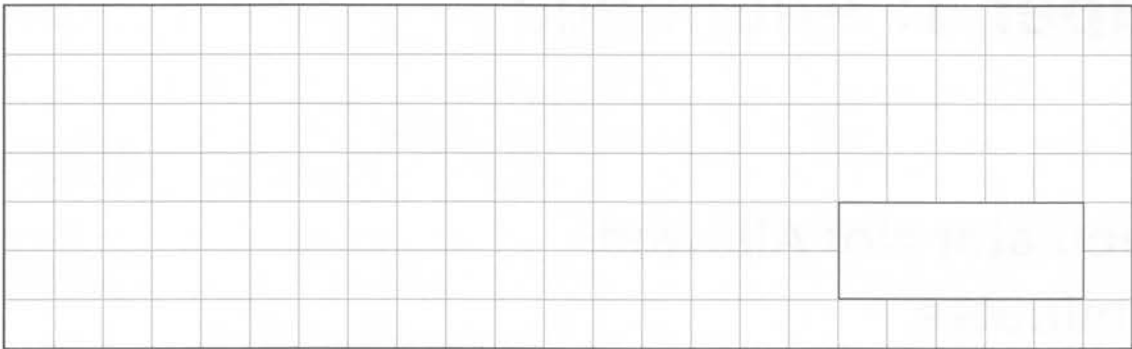
$934 + 100 =$



1 mark

2

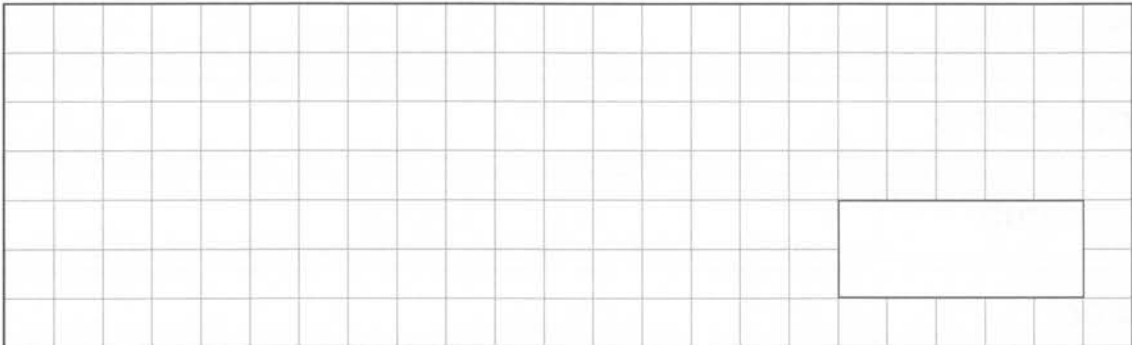
$34 \times 2 =$



1 mark

3

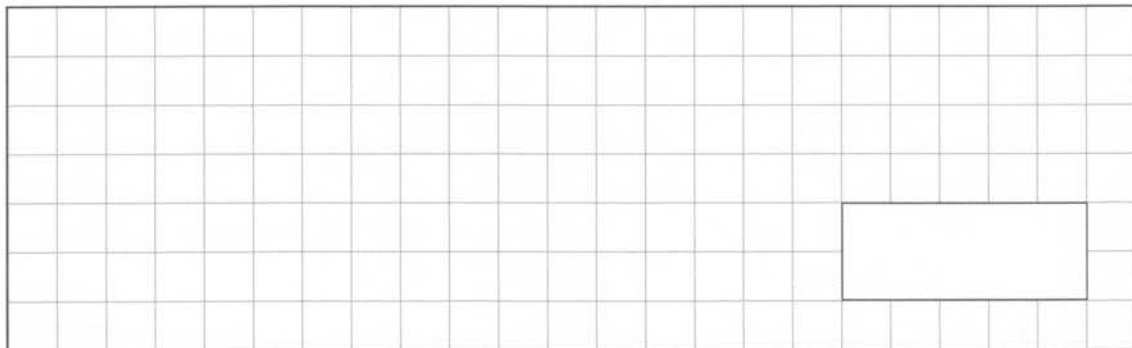
$289 - 6 =$



1 mark

4

$482 \div 1 =$



1 mark

5

$85 \div 5 =$

1 mark

6

$= 1427 + 635$

1 mark

7

$6 \times 5 \times 4 =$

1 mark

8

$3 - 9 =$

1 mark

9

$$\boxed{} = 3892 - 583$$

1 mark

10

$$4.7 - 0.2 =$$

1 mark

11

$$11\,000 - 200 =$$

1 mark

12

$$70 \times 110 =$$

1 mark

13

$$5.002 + 3.46 =$$



1 mark

14

$$5348 \times 6 =$$



1 mark

15

$$840 \div 7 =$$



1 mark

16

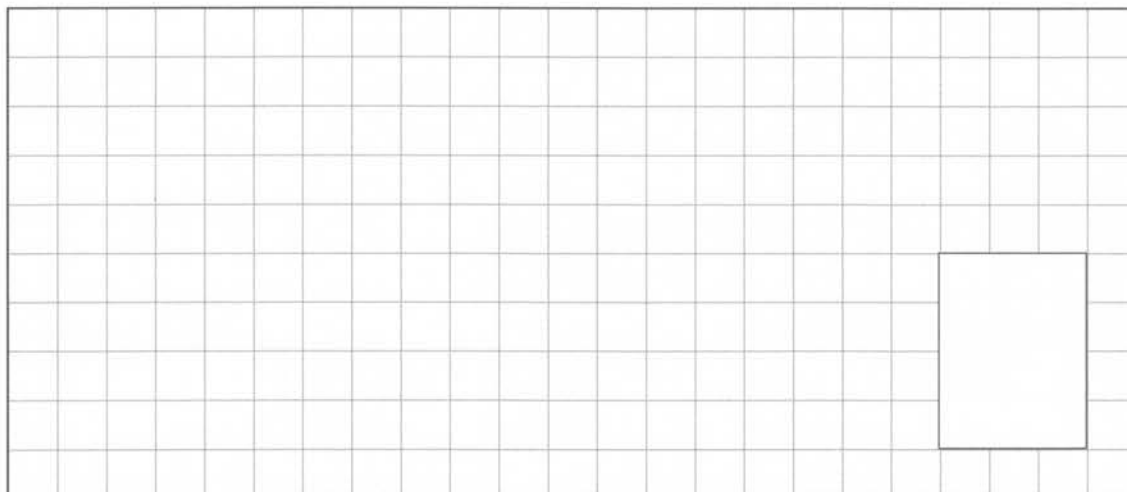
$$100 \times 28.4 =$$



1 mark

17

$$\frac{7}{9} - \frac{2}{9} =$$



1 mark

18

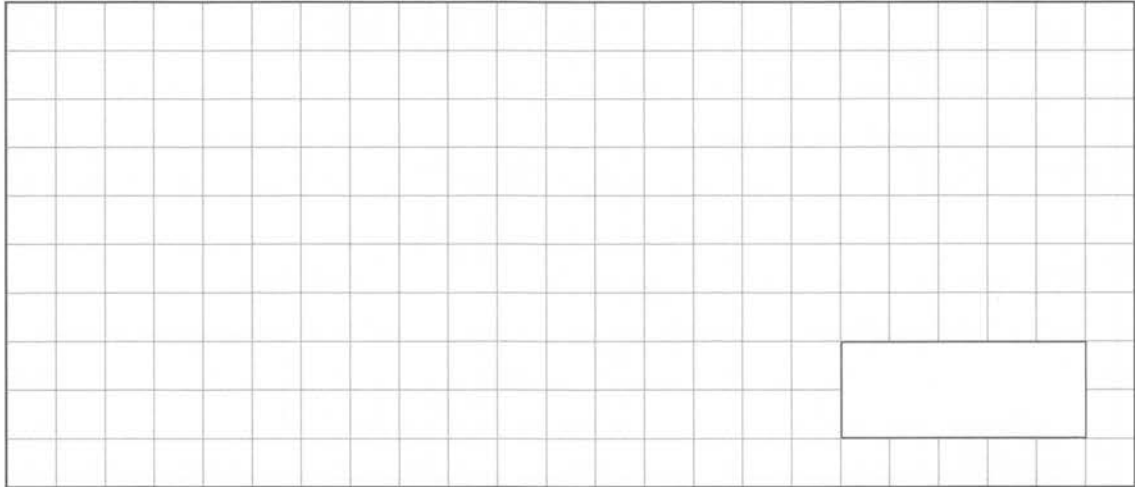
$$437.25 - 64.1 =$$



1 mark

19

$$6276 \div 4 =$$



1 mark

20

$$\frac{4}{7} \text{ of } 49 =$$



1 mark

21

$$2^3 + 4^2 =$$



1 mark

22

$14.2 - 6.74 =$




1 mark

23

$$\begin{array}{r} 68 \\ \times 43 \\ \hline \end{array}$$

Show
your
working



2 marks

24

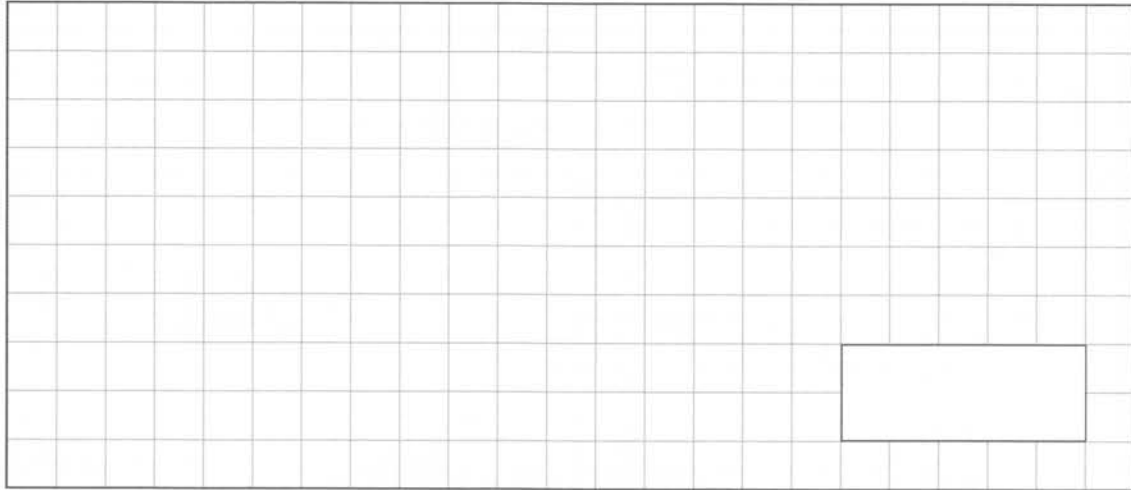
$596\,782 - 38\,426 =$



1 mark

25

$20\% \text{ of } 3500 =$



1 mark

26

$2.63 \times 4 =$

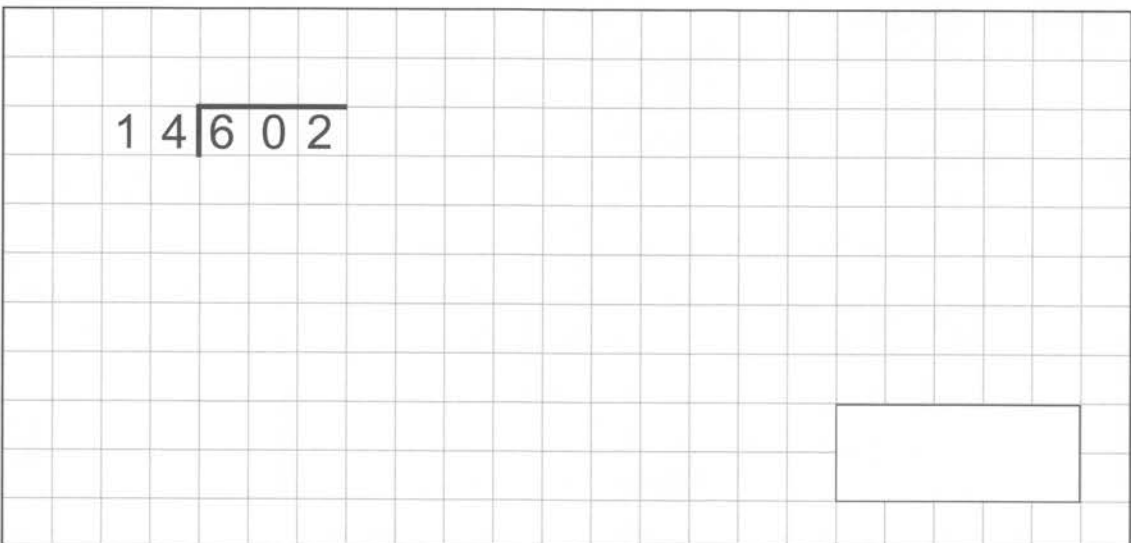


1 mark

27

$14 \overline{) 602}$

Show
your
working



2 marks

28

$$\frac{2}{3} + \frac{7}{9} =$$

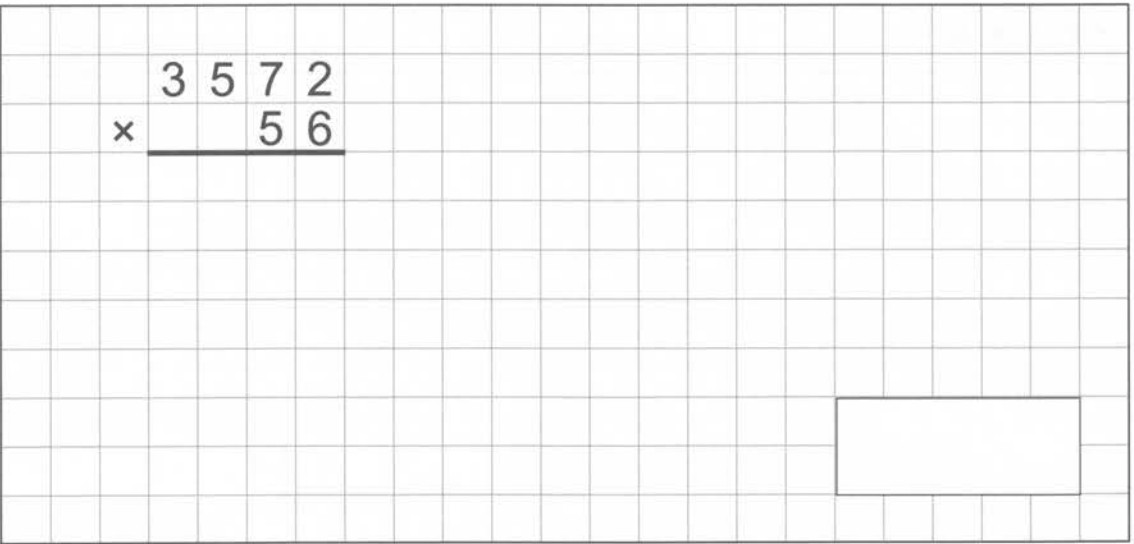


1 mark

29

$$\begin{array}{r} 3572 \\ \times \quad 56 \\ \hline \end{array}$$

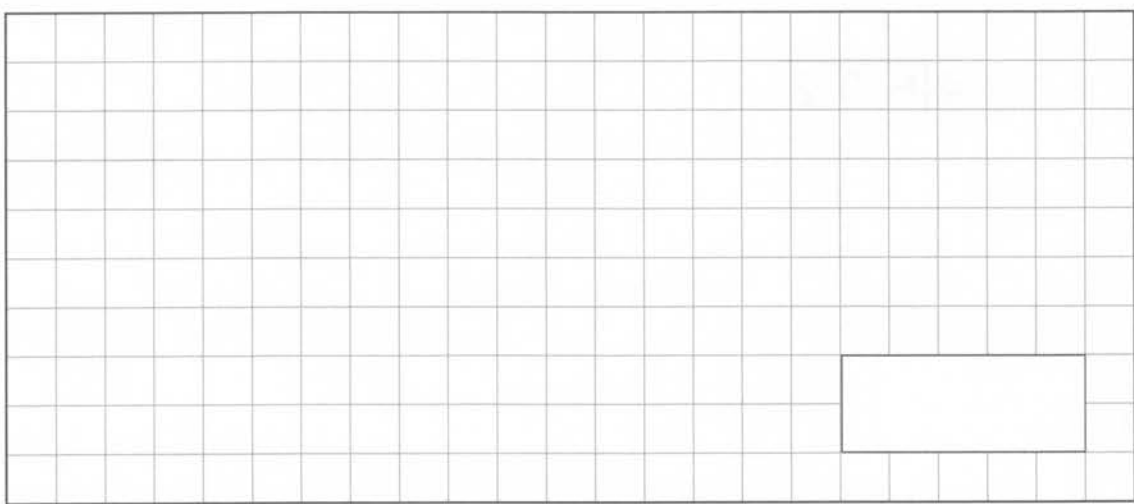
Show
your
working



2 marks

30

$$95\% \times 760 =$$



1 mark

31

$$\frac{4}{9} \times \frac{5}{7} =$$

1 mark

32

$$36 \overline{) 2340}$$

Show
your
working

2 marks

33

$$1\frac{3}{8} \times 7 =$$

1 mark

34

$$2\frac{1}{3} - 1\frac{2}{5} =$$

1 mark

35

$$\frac{5}{6} \div 9 =$$

1 mark

36

$$24 \div (6 - 3) \times 2 =$$

1 mark

Key Stage Two Mathematics



Set A Paper 2: Reasoning

Calculator Not Allowed
40 minutes

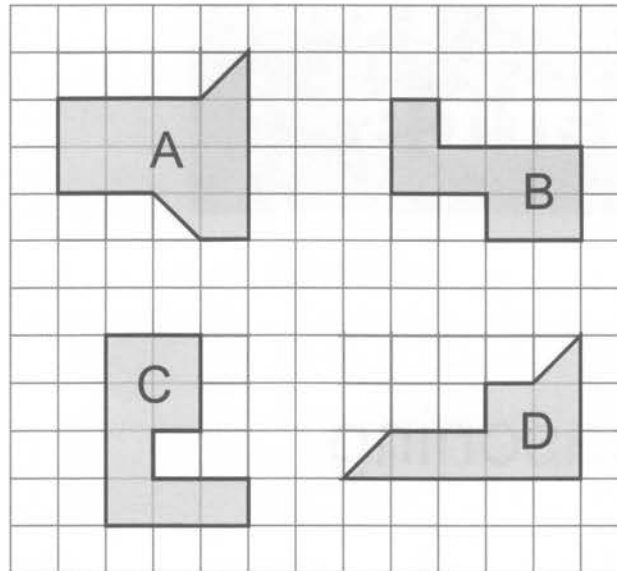
First name						
Middle name						
Last name						
School						
Date of birth	Day		Month		Year	

Total marks

--

1

The shapes below are drawn on a 1 cm square grid.



Not
actual
size

What is the area of shape A?

cm²

1 mark

Which **two** shapes have the same area?



and



1 mark

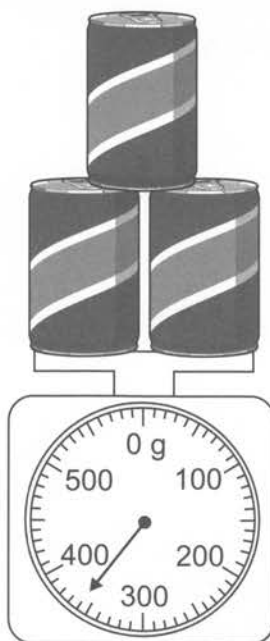
2

Write 72 589 in words.

1 mark

3

Jessica weighs three identical cans of fizzy drink.



How much does each can weigh?

g

1 mark

4

Neil has 40 animals on his farm.

$\frac{7}{10}$ of the animals are sheep.

How many sheep are there on the farm?

1 mark

8 of the animals are chickens.

What fraction of the animals on the farm are chickens?

Give your answer in its simplest form.

1 mark

5

Anita divides 1438 by a multiple of 10.

Her answer has a **3** in the **tenths** column.

What number did she divide by?

1 mark

Katie has 8 identical cups.
She pours 218 ml of water into each cup.

Show
your
working

litres

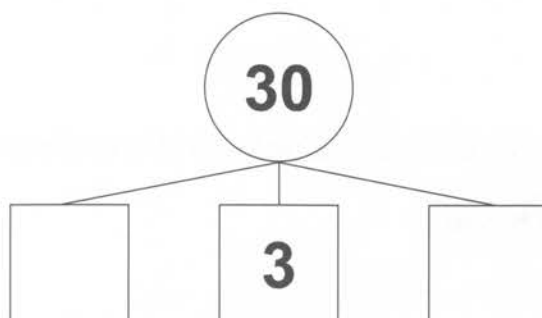
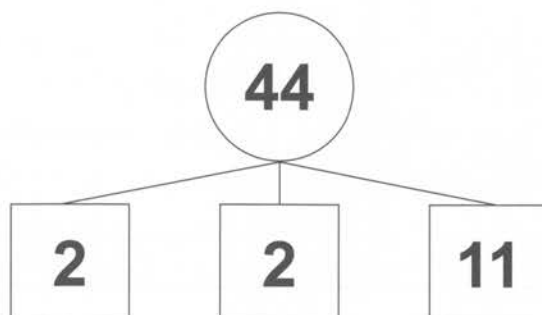
Shape A is translated by 5 units left and 3 units up to give shape B.

Page 5 of 12

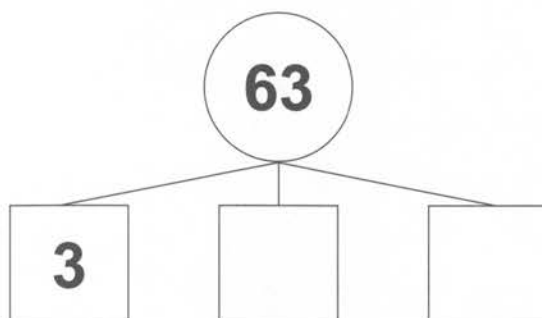
In each diagram below, the numbers in the squares are prime numbers. Multiplying together the numbers in the squares gives the number in the circle.

Fill in the missing numbers in the squares.

The first one has been done for you.



1 mark



1 mark

On the map below, 1 cm represents 50 m.



1 mark

Izzy, Tariq and Henry have each knitted part of a scarf.

Izzy has knitted 20.5 cm.

Tariq has knitted half as much as Izzy.

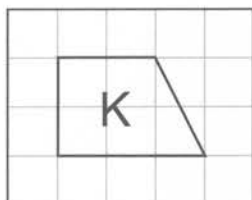
Henry has knitted three times as much as Tariq.

How much have they knitted between them?

2 marks

11

Enlarge shape K by a scale factor of 3. Draw your answer on the grid.



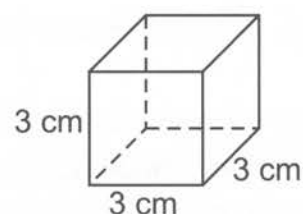
1 mark

12

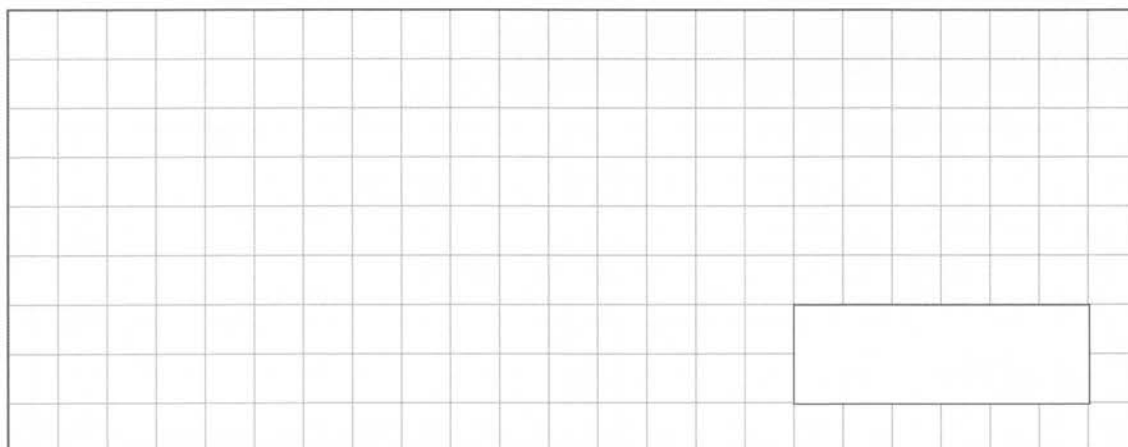
Leah makes a tower using identical wooden cubes with side length 3 cm, as shown on the right.

The volume of her tower is 270 cm^3 .

How many cubes does Leah use?



Show
your
working



2 marks

13

Chris buys 2 identical bags of cherries to make a pie.
There are more than 10 but less than 30 cherries in each bag.

Chris eats 7 cherries, then uses half of the rest in his pie.

Chris uses 11.5 cherries for his pie.

How many cherries were in each bag to start with?

Show
your
working

2 marks

14

Draw lines between the two pairs of fractions that add up to 5.

$$2\frac{3}{7}$$

$$\frac{6}{7}$$

$$3\frac{4}{7}$$

$$\frac{8}{7}$$

$$1\frac{1}{7}$$

$$\frac{18}{7}$$

$$1\frac{5}{7}$$

$$\frac{23}{7}$$

2 marks

15

Sea level is at 0 m.

The highest point on Ammonite Island is at 325 m.

The lowest point on Ammonite Island is at -32 m.

What is the difference in metres between the highest and lowest points?

m

1 mark

A well is dug at the lowest point on Ammonite Island.

It is 12 m deep.

How many metres below sea level is the bottom of the well?

m

1 mark

16

Phyllis has raised £30.60 for charity.

She gives **one third** of the money raised to a homeless charity.

She gives £4.90 to an animal charity.

How much money is left over?

Show
your
working

2 marks

17

Tam has 8 toffee apples. He makes 13 more, then shares all his toffee apples equally between his 3 sisters.

Circle the number sentence that shows what Tam has done.

$$8 \div (13 + 3)$$

$$(8 + 13) \div 3$$

$$8 + 13 \div 3$$

1 mark

18

The test results for 8 children are shown below:

Rachel: 62 marks

Joshua: 65 marks

Declan: 74 marks

Paolo: 59 marks

Aziza: 81 marks

Caroline: 67 marks

Clara: 56 marks

Noah: 72 marks

What is the mean mark?

Show
your
working

2 marks

19

Pippa has a bag of 50 sweets.

She gives 22% of the sweets to Khalid and eats 5 herself.

What **percentage** of the bag of sweets is left?

Show
your
working

2 marks

20

There are 20 472 people in the audience at a concert.

Some people travelled to the concert by coach.

There were 278 coaches, each carrying 43 people.

The rest travelled by train.

How many people travelled by train?

Show
your
working

A full-page sheet of white graph paper with a light gray grid. The grid consists of small squares. In the bottom right corner, there is a rectangular box, also outlined in gray, which appears to be a placeholder for a logo or page number. The rest of the page is empty grid.

3 marks

Key Stage Two Mathematics



Set A Paper 3: Reasoning

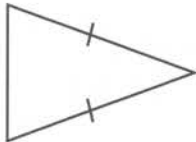
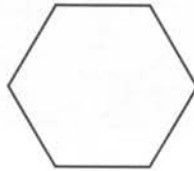
Calculator Not Allowed
40 minutes

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

Total marks

--

Look at the shapes below.



1 mark

Tyler and Melanie make some cards for the school fair.

Melanie makes 19 cards.

How many packs have they made?

[illegible]

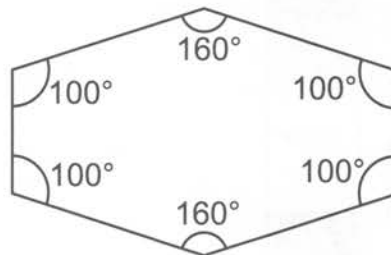
2 marks

- 3 It takes Sita four and a quarter hours to finish a jigsaw.
It takes Zach five hours and ten minutes to finish the same jigsaw.
How much longer does Zach take to finish the jigsaw than Sita?

minutes

1 mark

- 4 Is the polygon below regular or irregular?

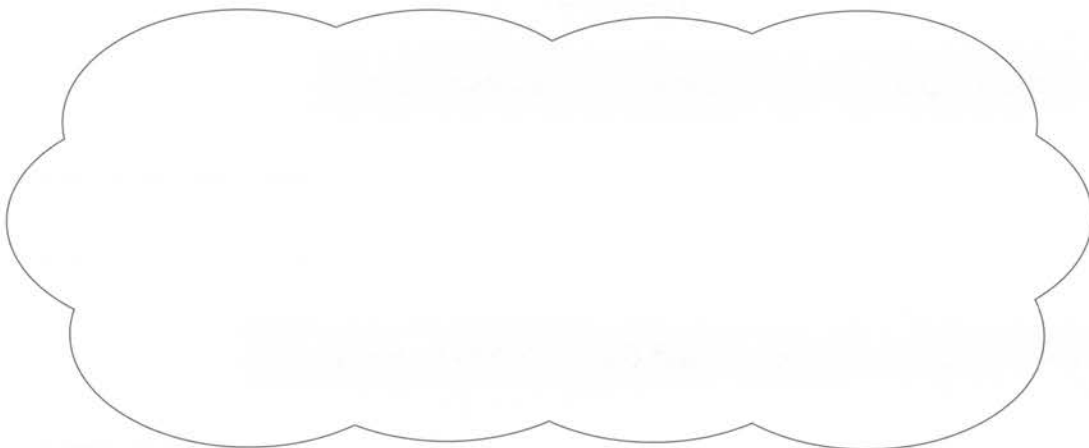
☐

Regular

☐

Irregular

Explain how you know.



1 mark

5

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

0.18

1.081

1.8

0.818

0.8

smallest

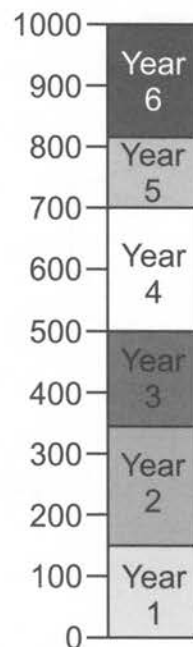
largest

1 mark

6

A school is collecting toys to give to charity.

The chart below shows how many toys each year group have collected.



How many more toys have Year 4 collected than Year 1?

1 mark

How many toys have Years 5 and 6 collected between them?

1 mark

7

Part of a bus timetable is shown below.

Darrow	11:58	12:17	12:45	13:01
Yalton	12:12	12:31	12:59	13:15
Brindale	12:19	12:38	13:06	13:22
Pireleth	12:42	13:01	13:29	13:45

How long does it take to get from Darrow to Brindale?

minutes

1 mark

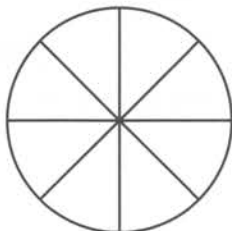
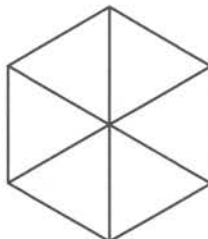
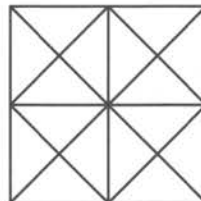
Nadiya lives in Yalton and has to be in Pireleth by 1.15 pm.

What is the latest bus she can catch from Yalton?
Give your answer using the 24-hour clock.

1 mark

8

Shade the given amount of each shape below.

 $\frac{5}{8}$

 $\frac{2}{3}$

 $\frac{3}{8}$


2 marks

9

Ayla is thinking of a number.

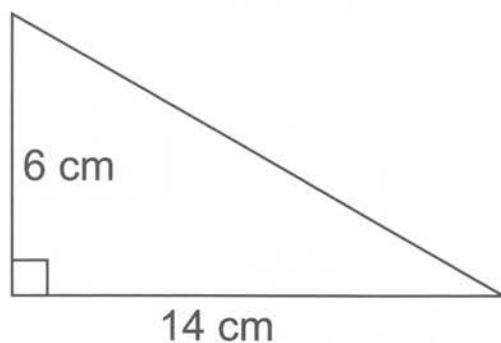
She says, "My number is a square number.
It is bigger than 5×8 and smaller than $120 \div 2$."

What number is Ayla thinking of?

1 mark

10

Calculate the area of the shape below.



1 mark

11

Fill in the missing numbers to make this calculation correct.

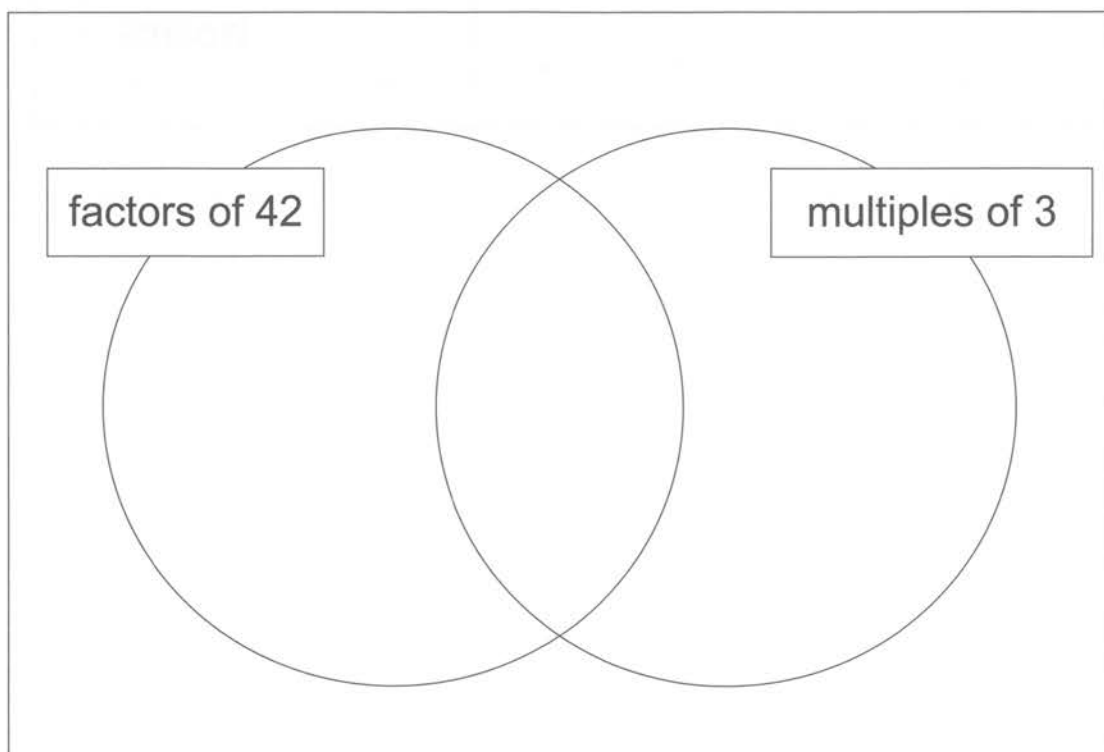
$$\begin{array}{r}
 \begin{array}{|c|c|c|} \hline 2 & 4 & \square \\ \hline \end{array} \\
 \times \begin{array}{|c|c|} \hline \square & 6 \\ \hline \end{array} \\
 \hline
 \begin{array}{|c|c|c|c|} \hline 1 & 4 & 7 & 0 \\ \hline \end{array} \\
 \begin{array}{|c|c|c|c|} \hline 4 & 9 & 0 & 0 \\ \hline \end{array} \\
 \hline
 \begin{array}{|c|c|c|c|} \hline 6 & 3 & 7 & 0 \\ \hline \end{array}
 \end{array}$$

2 marks

12

Put each number in the correct place on the diagram below.

2 6 7 9 21



2 marks

13

A baby-sitter works out how much to charge using this formula:

$$\text{Fee} = \text{£}5 \times \text{number of hours} + \text{£}8$$

How much does he charge if he baby-sits for 4 hours?

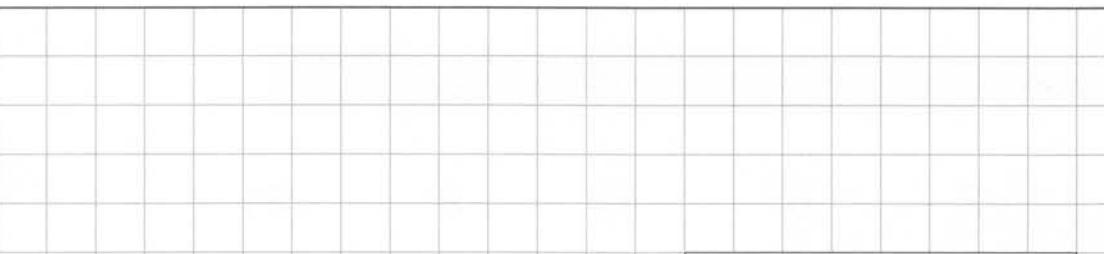
--	--

1 mark

One evening he charges £20.50.

How long did he baby-sit for?

Show
your
working



hours

2 marks

- 14 There are some watermelons at a buffet. Each one is cut into 12 equal slices. There are 9 people at the buffet. Each person eats 3 slices of watermelon.

Write the number of watermelons eaten as a mixed number.

Give your answer in its simplest form.

1 mark

- 15 Adult cinema tickets cost £7.25.
Children's cinema tickets cost £5.
A family buys 3 adult tickets and 6 children's tickets.
They split the cost equally between the 3 adults.

How much does each adult spend on cinema tickets?

Show
your
working

2 marks

16

$$\bullet + \bullet + \bullet = 81$$

Explain how you can use this fact to work out the answer to $5 \times \bullet$.

1 mark

17

Chad has this recipe for jam tarts.

Makes 12 jam tarts

120 g of butter
240 g of plain flour
60 ml of cold water
60 g of jam

Chad has a jar that contains **100 g** of jam.

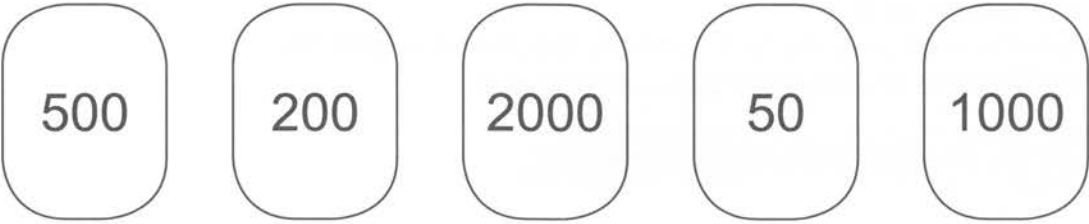
How many jam tarts can he make?

Show
your
working

2 marks

18

Ian has five differently numbered cards.



Which two cards can he multiply together to equal 10 000?

 and

1 mark

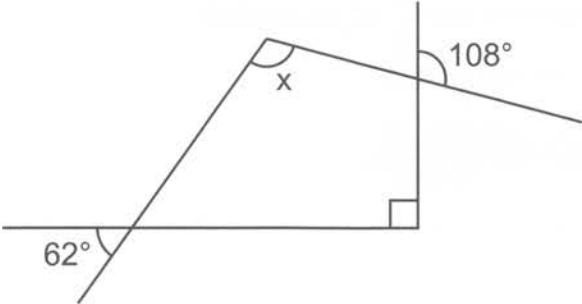
What is the smallest whole number Ian could make by dividing one card by another?

1 mark

19

Find the size of angle x in the shape below.

Do not use a protractor (angle measurer).



Not drawn accurately

Show
your
working

2 marks

Key Stage Two Mathematics



Set B

Paper 1: Arithmetic

Calculator Not Allowed

30 minutes

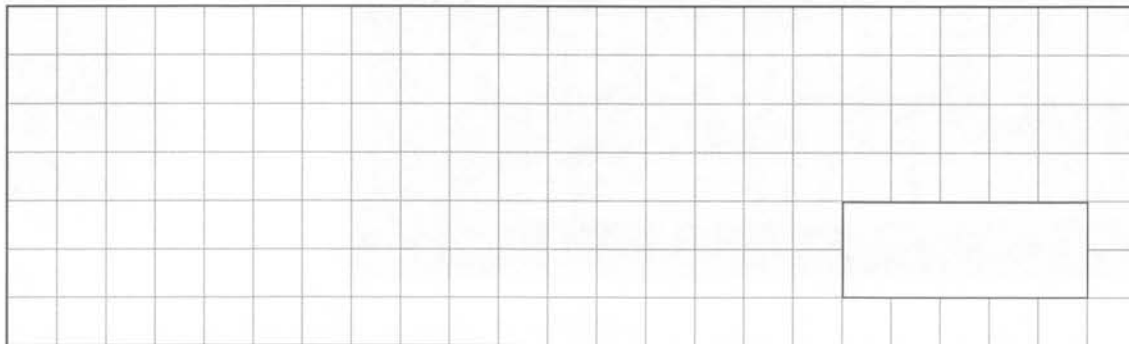
First name						
Middle name						
Last name						
School						
Date of birth	Day		Month		Year	

Total marks

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1

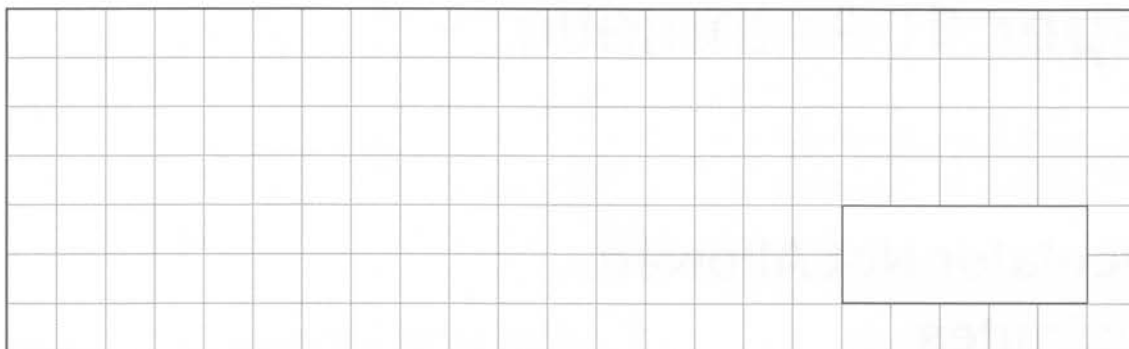
$6 \times 8 =$



1 mark

2

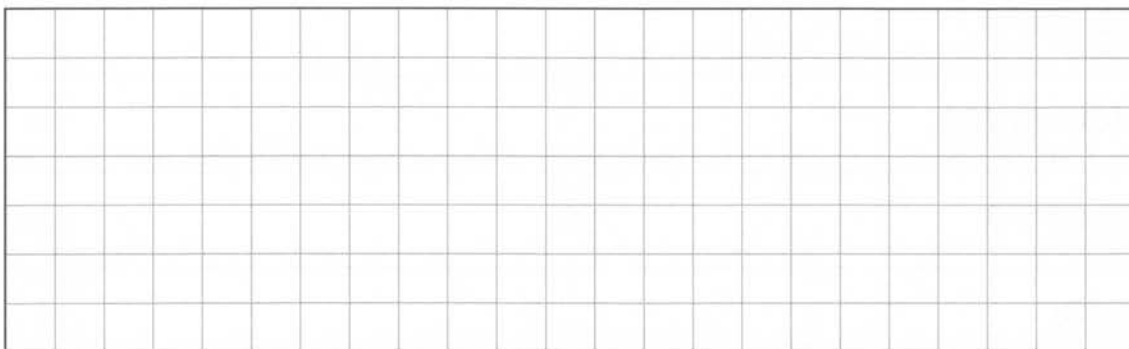
$2071 - 1000 =$



1 mark

3

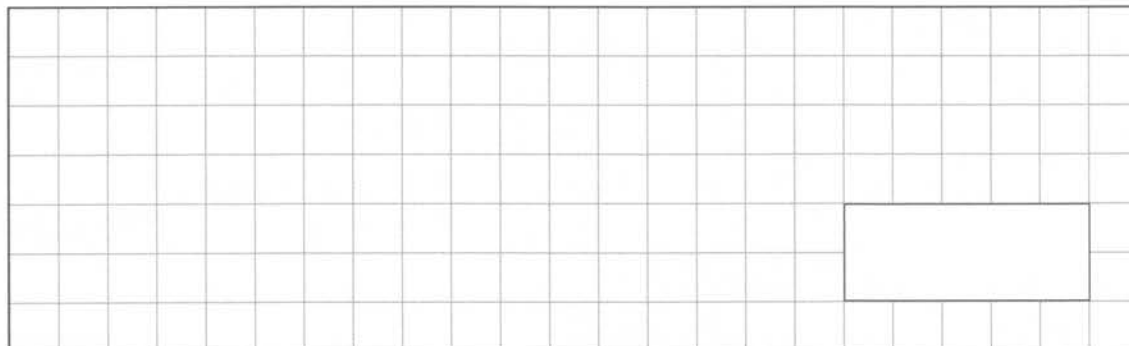
$= 285 + 34$



1 mark

4

$218 \times 0 =$



1 mark

[illegible]

 $132 \times 3 =$ A large grid of graph paper, consisting of 20 columns and 10 rows of squares. A rectangular box is drawn in the bottom right corner, spanning 5 columns and 2 rows of the grid.
$$32\,564 + 4178 =$$

A large grid of graph paper, consisting of 20 columns and 10 rows of squares. A rectangular box is drawn in the bottom right corner, spanning 5 columns and 2 rows, starting from the 15th column and 8th row, and ending at the 20th column and 10th row.

 $82 \times 4 =$ A large grid of graph paper, consisting of 20 columns and 10 rows of squares. A small rectangular box, measuring 4 squares in width and 2 squares in height, is located in the bottom right corner of the grid, spanning from the 16th to the 20th column and the 8th to the 10th row.

Page 3 of 12

9

$$-15 + 21 =$$

A grid for calculation, 20 columns wide and 10 rows high. A rectangular box is located in the bottom right corner, spanning 5 columns and 2 rows.

1 mark

10

$$87 \div 3 =$$

A grid for calculation, 20 columns wide and 10 rows high. A rectangular box is located in the bottom right corner, spanning 5 columns and 2 rows.

1 mark

11

$$463\,257 + 58\,916 =$$

A grid for calculation, 20 columns wide and 10 rows high. A rectangular box is located in the bottom right corner, spanning 5 columns and 2 rows.

1 mark

12

$$32\,756 - 2423 =$$

1 mark

13

$$4.002 + 8.34 =$$

1 mark

14

$$300 \times 200 =$$

1 mark

15

$$36.47 + 5.629 =$$

1 mark

16

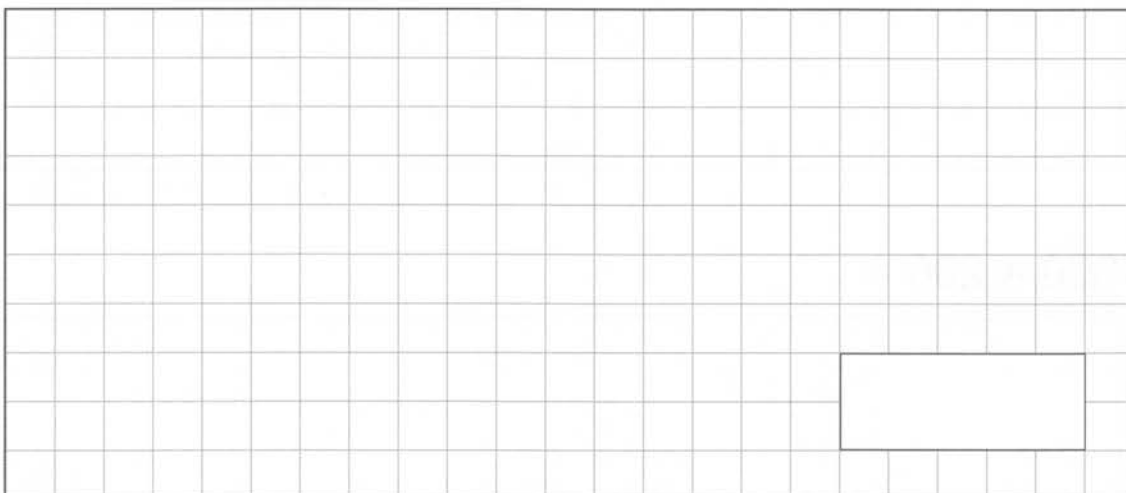
$$7^2 - 15 =$$



1 mark

17

$$744 \div 6 =$$



1 mark

18

$$15 - 0.4 =$$



1 mark

19


$$143 \div 1000 =$$



1 mark

20


$$0.8 \times 7 =$$



1 mark

21

$$7200 \div 12 =$$



1 mark

22

$$26 - 8.43 =$$

A large grid for working space, 20 units wide and 20 units high. A small rectangular box is located in the bottom right corner, spanning 4 units wide and 2 units high.

1 mark

23

$$30\% \times 900 =$$

A large grid for working space, 20 units wide and 20 units high. A small rectangular box is located in the bottom right corner, spanning 4 units wide and 2 units high.

1 mark

24

$$\begin{array}{r} \times \quad 76 \\ \hline \quad 24 \end{array}$$

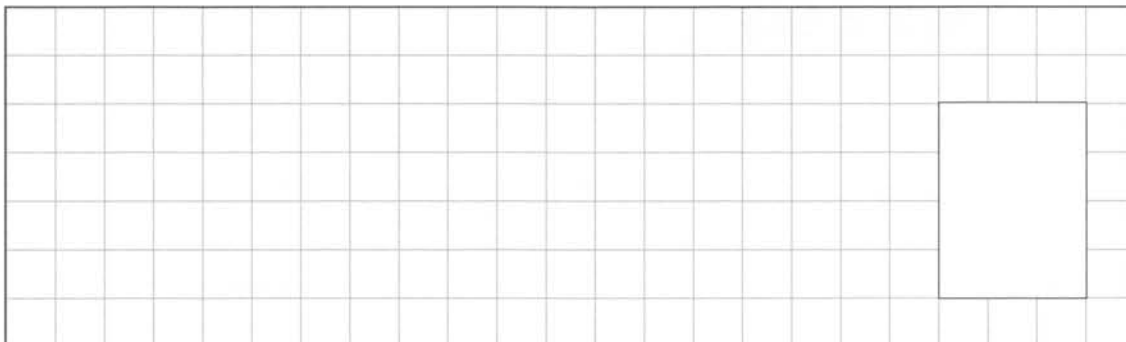
Show
your
working

A large grid for working space, 20 units wide and 20 units high. A small rectangular box is located in the bottom right corner, spanning 4 units wide and 2 units high.

2 marks

25

$$\frac{3}{5} + \frac{4}{5} =$$



1 mark

26

$$63.52 \div 8 =$$



1 mark

27

$$14 + 28 \div 7 =$$



1 mark

28

1 6 | 3 8 8 8

Show
your
working

2 marks

29

$$\frac{15}{16} - \frac{3}{8} =$$

1 mark

30

$$65\% \text{ of } 60 =$$

1 mark

31

$$\begin{array}{r} 463 \\ \times 37 \\ \hline \end{array}$$

Show
your
working

2 marks

32

$$\frac{8}{9} \div 4 =$$

1 mark

33

$$\frac{5}{9} \times 360 =$$

1 mark

34

2	4	2	2	5	6
---	---	---	---	---	---

Show
your
working



2 marks

35

$$5 \times 2\frac{3}{4} =$$



1 mark

36

$$\frac{3}{5} + 2\frac{1}{2} =$$



1 mark

Key Stage Two Mathematics



Set B Paper 2: Reasoning

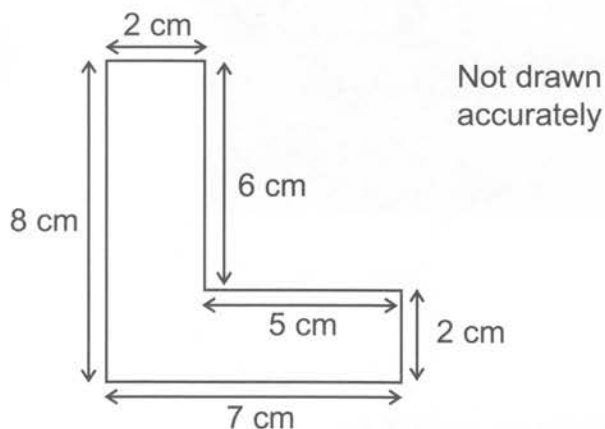
Calculator Not Allowed
40 minutes

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

Total marks

--

Work out the perimeter of this shape.



cm

1 mark

Tia has 120 beads.

She makes 8 bracelets with 12 beads each.

She uses the rest of the beads to make a necklace.

How many beads does she use to make the necklace?










Show
your
working

[illegible]

2 marks

3

Clare counted the number of different types of clothes in her wardrobe.
The pictogram shows what she found.

T-shirts	   
Jumpers	
Skirts	 
Dresses	  

Key:  = 4 items of clothing

Clare has 11 jumpers.

Use this information to complete the pictogram.

1 mark

What is the difference between the number of T-shirts and the number of skirts Clare has?

1 mark

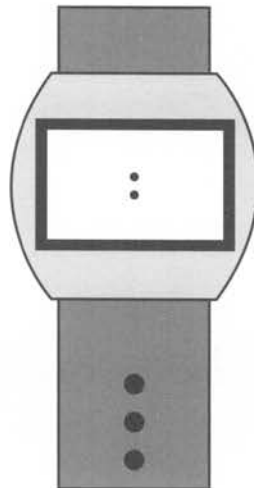
4

Owen looks at his classroom clock in the **afternoon**.
This is what he sees.



Owen's digital watch uses the **24-hour** clock format.

What time will the watch show? Fill in the time on his watch.



1 mark

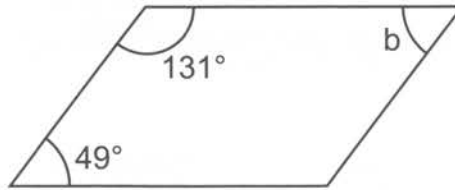
Owen's school day finishes at **twenty-five past three**.

How long is it until the end of the school day?
Give your answer in hours and minutes.

1 mark

5

This is a **parallelogram**.



Not drawn accurately

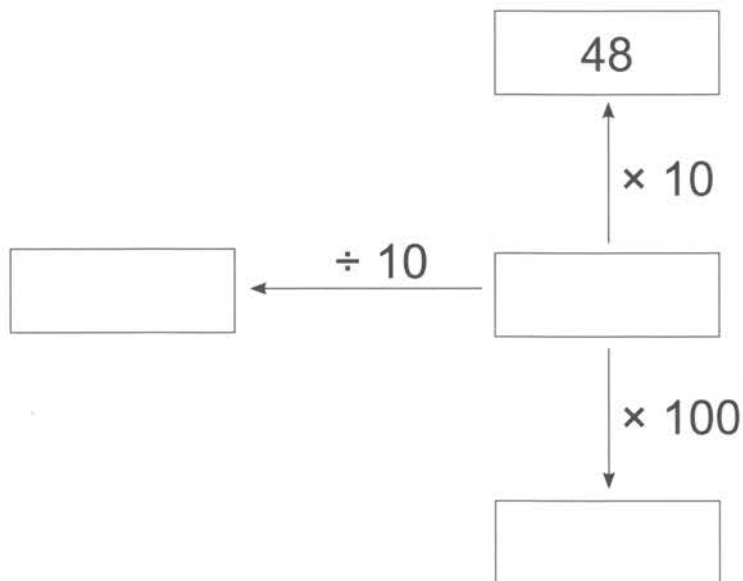
What is the size of angle b?

Do **not** use a protractor (angle measurer).

1 mark

6

Fill in the empty boxes below.



2 marks

7

Fill in the missing digits to make this calculation correct.

$$\begin{array}{r}
 \boxed{}9\boxed{}2 \\
 + \quad \boxed{}34 \\
 \hline
 231\boxed{}
 \end{array}$$

2 marks

Circle a pair of measurements that could be the width and length of a rectangle with area **1000 cm²**.

400 cm

500 cm


6 balls weigh **540 g** in total.



2 balls and 1 bat weigh **460 g** in total.



How much does 1 bat weigh?



A 20x10 grid with a label 'g' in the bottom right corner.

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10

Jenny picks a number from this list:

64 1 11 27 18 8

Jenny says:

"My number is a cube number.

When I add 2 to my number I get a prime number.

When I subtract 2 from my number I get a square number."

Which number did Jenny pick?

1 mark

11

675 438 people live in a city.

Round the number of people to the nearest 10 000.

1 mark

To the nearest 100, there are 89 600 dogs living in the city.

Which of these could be the actual number of dogs? Circle all the options.

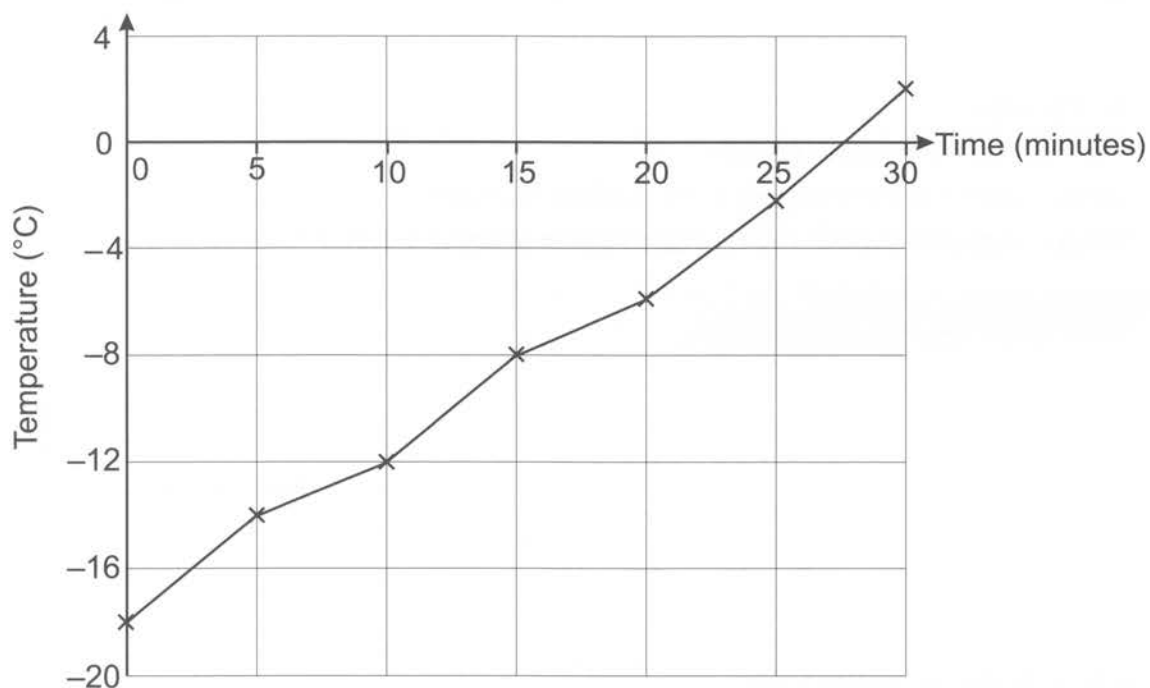
89 658 89 557 89 628 89 543

1 mark

12

Rupa took a small tub of ice cream out of the freezer.

The graph shows the temperature of the ice cream during the next 30 minutes.



After how many minutes was the ice cream 10°C warmer than when it was taken out of the freezer?

minutes

1 mark

What was the **difference** between the temperature at 20 minutes and the temperature at 30 minutes?

$^{\circ}\text{C}$

1 mark

13

Write down a **common factor** of 18 and 27 that is also a **prime** number.

--

1 mark

14

On Monday, Emma sold 30 identical scarves for a total of £180.

On Tuesday, she sold 7 more than she sold on Monday.

How much money did Emma get in total on Tuesday?

Show
your
working

[illegible]

2 marks

15

Write a number in the box to make each sentence correct.

The sum of 0.998 and		is 1.
----------------------	--	-------

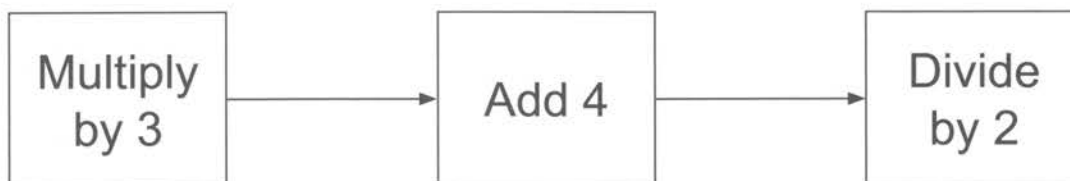
--	--

1 mark

1.25 is halfway between 0.7 and

1 mark

Aidan chooses a number between 1 and 50 and follows these instructions:



Aidan's answer is **15.5**.

What number did Aidan choose?

Show
your
working

[illegible]

2 marks

17

Kat and Sanjeev are collecting money for charity.
For every **£2** that Kat collects, Sanjeev collects **£3**.
They collect **£255** in total.

How much money do they each collect?

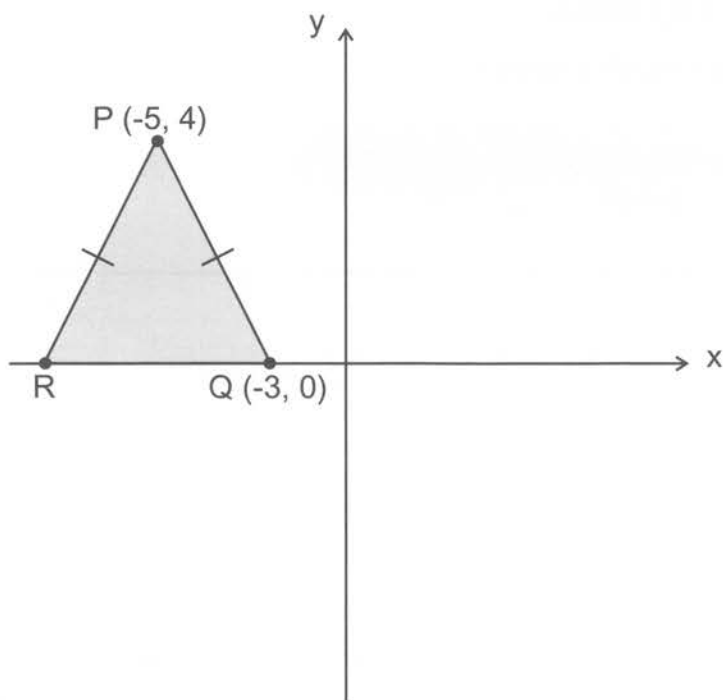
Show
your
working

Kat:	
Sanjeev:	

2 marks

18

The triangle shown on the axes below is an isosceles triangle.



What are the coordinates of vertex R?

1 mark

The triangle is reflected in the **y-axis**.

What are the coordinates of the image of vertex P in the **reflected** triangle?

1 mark

19

Fill in the missing fraction.

$$1 - \frac{3}{7} - \boxed{} = \frac{5}{14}$$

1 mark

20

There are 250 books in Angela's classroom.

120 of the books are story books.

$\frac{3}{4}$ of the **story books** contain pictures.

What percentage of all the books in the classroom are story books with pictures?

Show
your
working

A blank sheet of graph paper with a grid pattern. A small rectangular box is located in the bottom right corner, containing the symbol "%".

2 marks

21

$$\frac{1}{8} \times 648 = 81$$

Explain how you can use this fact to work out the answer to $\frac{1}{4} \times 648$

1 mark

Key Stage Two Mathematics



Set B Paper 3: Reasoning

Calculator Not Allowed
40 minutes

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

Total marks

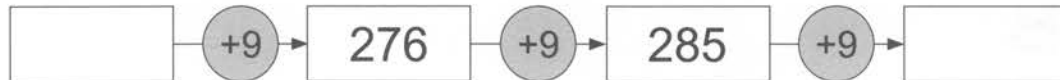
--

1

Fill in the empty boxes.



1 mark



1 mark

2

The nets below can be folded up to make 3D shapes.

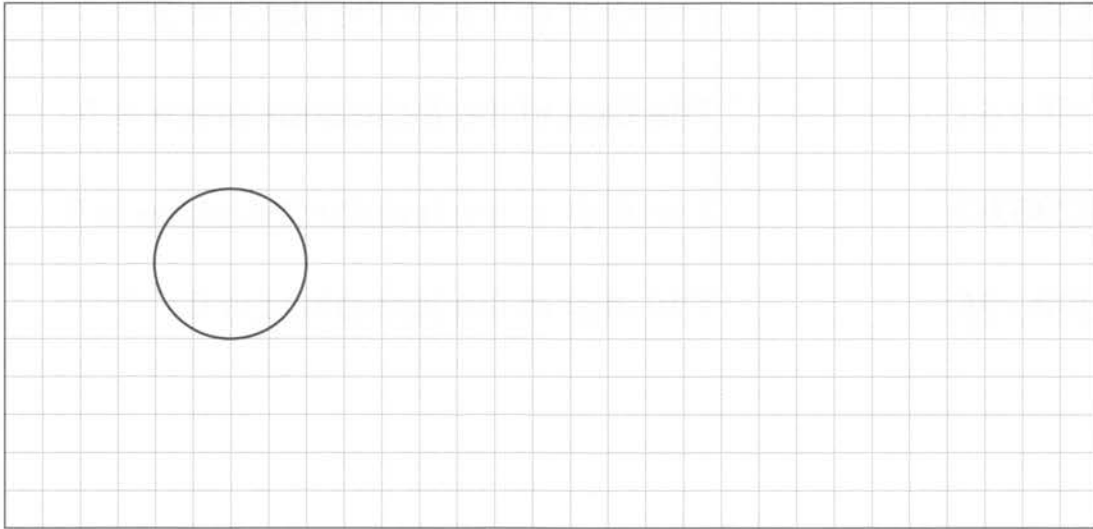
Write down the number of vertices of that each 3D shape would have.

Net of 3D shape	Number of vertices of 3D shape

1 mark

3

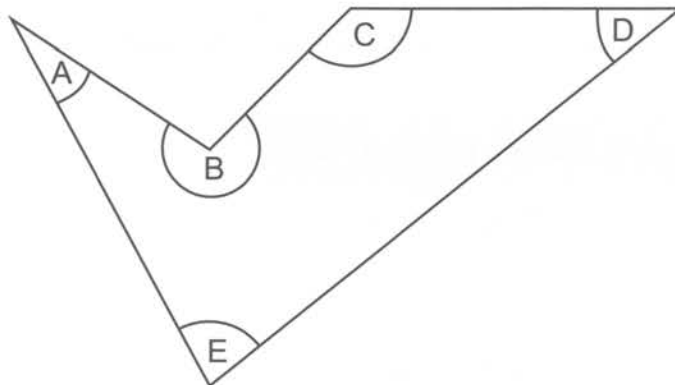
On the grid below, draw a square with side length equal to **three times** the **radius** of the circle.



1 mark

4

Look at the shape below.



Which angle is a **reflex** angle?

1 mark

What is the size of the **obtuse** angle? Use a protractor (angle measurer).

1 mark

5

Draw lines to match each number with the correct sentence.

41352.86

The digit in the tenths place is 5.

36894.54

The digit in the thousands place is 3.

79285.63

The digit in the hundredths place is 6.

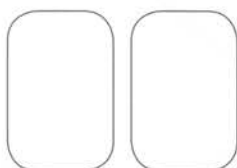
23698.25

The digit in the tens place is 8.

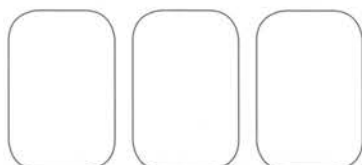
2 marks

6

Here are some digit cards.

Use **two** of the cards to make a prime number.

1 mark

Use **three** of the cards to make a multiple of 12.

1 mark

A jumper costs £15.74

What is the cost of the jumper to the nearest pound?

--

1 mark

What is the cost of the jumper to the nearest ten pence?

1 mark

Lisa buys 4 cucumbers and 2 peppers.
The cucumbers cost 70p each.
The total cost is £4.10.

What is the cost of 1 pepper?

Show
your
working

[illegible]

2 marks

The letters below are made up of straight lines.

A

E

H

T

V

Z

Write down all the letters that have **parallel** lines.

1 mark

Write down all the letters that have **perpendicular** lines.

1 mark

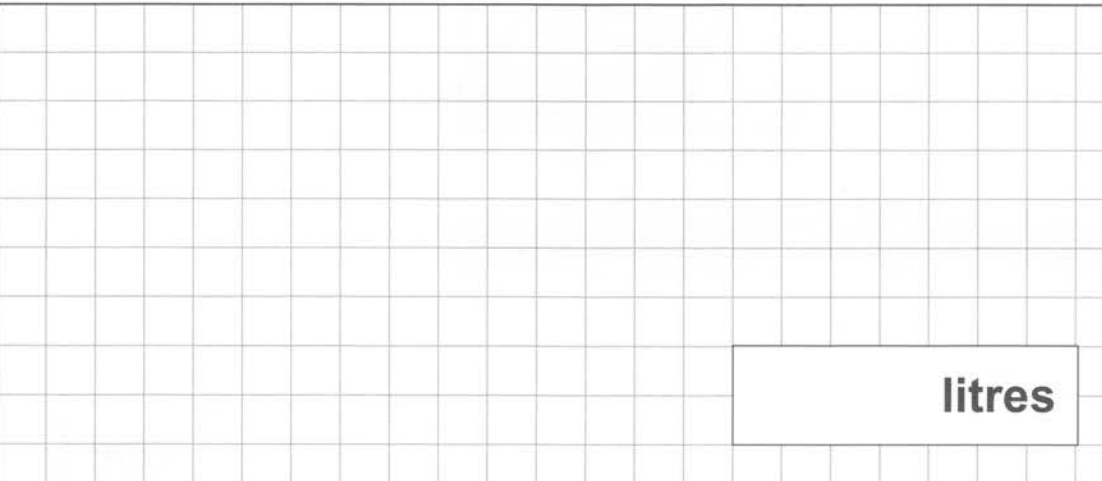
10

Elliot is painting his house.
3.5 litres of paint covers 3 walls.

He paints 9 walls per day.

How much paint will he use in 4 days?

Show
your
working



litres

2 marks

11

John walks past an old house.
The year the house was built is shown in Roman numerals.

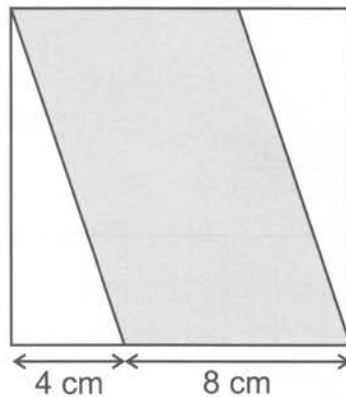
MDCXXXIV

What year was the house built?

1 mark

12

A parallelogram is drawn inside a square, as shown.



What is the area of this shaded parallelogram?

cm^2

1 mark

13

Frances has f hats and Millie has m hats.

Frances has **5 times** as many hats as Millie.

Circle the statement that shows this.

$$m = 5f$$

$$f = 5m$$

$$5f = 10m$$

1 mark

Jeremy has j scarves. He writes this statement:

$$7j = 42$$

How many scarves does Jeremy have?

1 mark

14

Put these fractions in order, starting with the smallest.

$$\frac{7}{9}$$

$$\frac{13}{18}$$

$$\frac{5}{6}$$

$$\frac{2}{3}$$



smallest

largest

1 mark

15

The organisers of a baking competition buy 2650 eggs.
For every 10 eggs they need 3 kg of flour.
Flour is sold in 2 kg bags.

How many bags of flour should they buy?

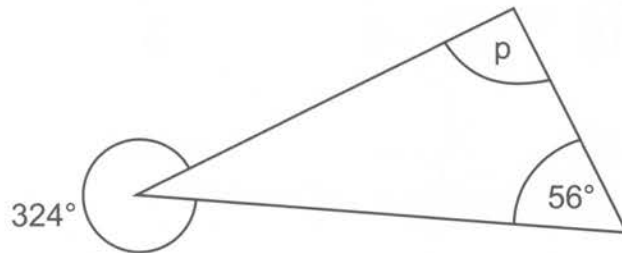
Show
your
working

2 marks

16

Work out the size of angle p in the triangle below.

Do **not** use a protractor (angle measurer).



Not drawn
accurately

Show
your
working

[illegible]

2 marks

17

6 peaches cost the same as 15 potatoes.

Each peach costs £0.45.

How much does 1 potato cost?

Show
your
working

A full-page sheet of white graph paper with a light gray grid. The grid consists of small squares. In the bottom right corner, there is a rectangular box, likely intended for a student's name or class information. The box is outlined in black and is currently empty.

2 marks

18

Fill in the missing number below.

$$= 1.4$$

1 mark

19

This sign shows the cost of tickets for a theme park.

Tickets: £16.95 each

Special offer:

For every 3 tickets you buy, get a 4th ticket free.

8 children visit the theme park and pay for their tickets together.

They also buy a baseball cap **each** as a souvenir.

The **total** cost of the tickets and the baseball caps is **£155.46**.

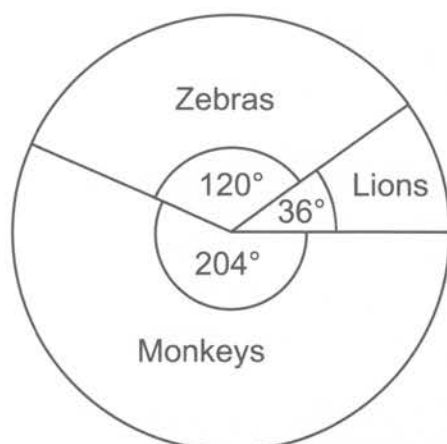
What is the cost of 1 baseball cap?

Show
your
working

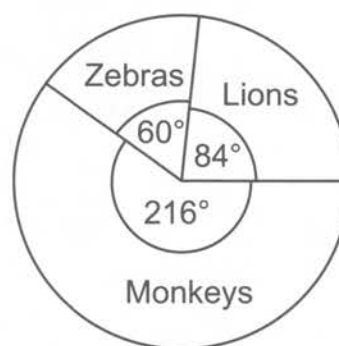
--

3 marks

The pie charts show the different types of animals in two zoos.
Zoo 1 has 90 animals and Zoo 2 has 60 animals.



Zoo 1
90 animals



Zoo 2
60 animals

What percentage of the animals in Zoo 1 are lions?

%

1 mark

Rohan says, "There are twice as many zebras in Zoo 1 as in Zoo 2."

Is Rohan correct?

Yes

☐

No

☐

Explain how you know.

1 mark



Key Stage Two

Mathematics

SATS Practice Papers

Instructions with Answers & Mark Scheme

Contents

Using the Practice Papers.....	3
Content Domain Coverage	5
Answers.....	7



Practice is the best way to prepare for the KS2 Maths SATs...

...and this brilliant pack of CGP Practice Papers has been fine-tuned to be a perfect match for the SATs in 2018 and beyond!

It contains two full sets of tests, each made up of three papers — just like the real test pupils will take in Year 6.

We've also included full answers and mark schemes in this booklet. That means it's easy to see which topics are their strongest, and where they need to concentrate their revision ahead of the SATs.

Published by CGP

Editors:

Chris Corrall, Ceara Hayden, Catherine Lear,
Caley Simpson, Ruth Wilbourne, Dawn Wright

Many thanks to Jonathan Wray for proofreading.

Clipart from Corel®

Printed by Elanders Ltd, Newcastle upon Tyne.

Text, design, layout and original illustrations

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no calculators allowed 35 marks

A mirror.

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How to Mark the Papers

Use the answers in this booklet to mark each paper, then write the scores in the table below. For each set, add up the scores for Paper 1, Paper 2 and Paper 3 to get a **mark out of 110**.

	Paper 1 mark out of 40		Paper 2 mark out of 35		Paper 3 mark out of 35		TOTAL mark out of 110
Set A	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	=	<u> </u>
Set B	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	=	<u> </u>

The scores for these practice papers will give you a pretty good idea of whether a child is working at the **expected standard** in **Maths**.

The mark needed to achieve the **expected standard** varies from year to year, but if they get **60** or more **out of 110** then they should be on track.

Content Domain Coverage

The mark schemes in this Answer Book refer to the content domain references as they appear in the Standards & Testing Agency's 'Mathematics test framework' document.

Qu.	Requirement	Guidance	Marks (Domain)
1	13 400, 14 499, 95 782, 134 500, 195 287		1 (5N2)

These refer to elements of the National Curriculum Programme of Study, which is split by Year.

For example, '5N2' refers to Year 5, substrand N2 ('read, write, order and compare numbers').

You will see in the mark scheme that some substrands are divided further. For example, 'N3a' refers to 'place value', while 'N3b' refers to 'roman numerals'.

For a detailed breakdown on the content of each year's substrands, please visit the 'Mathematics test framework' document on the STA website.

Content Domain Coverage

This table sets out the areas of the content domain that are assessed in these papers.

Topic	Sub-strand	Ref	Set A			Set B		
			Paper 1	Paper 2	Paper 3	Paper 1	Paper 2	Paper 3
Number and place value	counting (in multiples)	N1						Q1
	read, write, order and compare numbers	N2	Q1	Q2		Q2		
	place value; roman numerals	N3						Q5, 11
	identify, represent and estimate; rounding	N4					Q11	
	negative numbers	N5	Q8	Q15		Q9	Q12	
	number problems	N6						
Addition, subtraction, multiplication and division (calculations)	add / subtract mentally	C1	Q3, 11			Q5		
	add / subtract using written methods	C2	Q6, 9, 24			Q3, 7, 11, 12	Q7	
	estimate, use inverses and check	C3						
	add / subtract to solve problems	C4			Q2		Q2	
	properties of number (multiples, factors, primes, squares and cubes)	C5		Q8	Q9, 12		Q10, 13	Q6
	multiply / divide mentally	C6	Q4, 7, 12, 15, 16			Q1, 4, 14, 19, 21	Q6	
	multiply / divide using written methods	C7	Q2, 5, 14, 19, 23, 27, 29, 32	Q6	Q11	Q6, 8, 10, 17, 24, 28, 31, 34		
	solve problems (commutative, associative, distributive and all four operations)	C8		Q13, 20	Q2, 18		Q2, 9, 16, 21	Q15
	order of operations	C9	Q21, 36	Q17		Q16, 27		
Fractions, decimals and percentages	recognise, find, write, name and count fractions	F1						
	equivalent fractions	F2		Q4b	Q8, 14			
	comparing and ordering fractions	F3						Q14
	add / subtract fractions	F4	Q17, 28, 34	Q14		Q25, 29, 36	Q19	
	multiply / divide fractions	F5	Q20, 31, 33, 35			Q32, 33, 35		
	fractions / decimals equivalence	F6						
	rounding decimals	F7						Q7
	compare and order decimals	F8	Q10, 13, 18, 22		Q5	Q13, 15, 18, 22		
	multiply / divide decimals	F9	Q26	Q5		Q20, 26		Q5
	solve problems with fractions and decimals	F10		Q4 a			Q15, 20	Q8
	fractions / decimal / percentage equivalence	F11					Q20	Q18
	solve problems with percentages	F12						

Content Domain Coverage

Topic	Sub-strand	Ref	Set A			Set B		
			Paper 1	Paper 2	Paper 3	Paper 1	Paper 2	Paper 3
Ratio and proportion	relative sizes, similarity	R1		Q9	Q17		Q14	
	use of percentages for comparison	R2	Q25, 30	Q19		Q23, 30		
	scale factors	R3		Q11				
	unequal sharing and grouping	R4			Q21		Q17	Q17
Algebra	missing number problems expressed in algebra	A1			Q16, 20a			Q13
	simple formulae expressed in words	A2			Q13			
	generate and describe linear number sequences	A3						
	number sentences involving two unknowns	A4			Q20b			
	enumerate all possibilities of combinations of two variables	A5						
Measurement	compare, describe and order measures	M1						
	estimate, measure and read scales	M2		Q3				
	money	M3						
	telling time, ordering time, duration and units of time	M4			Q3		Q4	
	convert between metric units	M5		Q6				
	convert metric / imperial	M6						
	perimeter, area	M7		Q1	Q10		Q1, 8	Q12
	volume	M8		Q12				
	solve problems (a, money; b, length; c, mass / weight; d, capacity / volume)	M9		Q10, 16	Q15			Q10, 19
Geometry — properties of shapes	recognise and name common shapes	G1						
	describe properties and classify shapes	G2			Q1, 4			Q9
	draw and make shapes and relate 2-D to 3-D shapes (including nets)	G3						Q2
	angles – measuring and properties	G4			Q19		Q5	Q4, 16
	circles	G5						Q3
Geometry — position and direction	patterns	P1						
	describe position, direction and movement	P2		Q7			Q18	
	co-ordinates	P3					Q18	
Statistics	interpret and represent data	S1			Q6, 7		Q3 a	Q20
	solve problems involving data	S2			Q6		Q3 b, 12	
	mean average	S3		Q18				

Set A — Answers

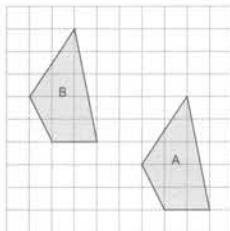
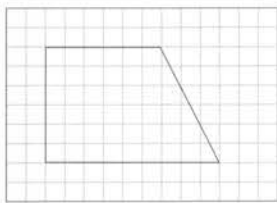
Set A Paper 1

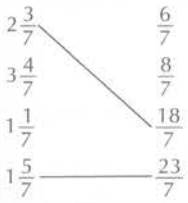
Qu.	Requirement	Guidance	Marks (Domain)
1	1034		1 (3N2b)
2	68		1 (3C7)
3	283		1 (3C1)
4	482		1 (4C6b)
5	$\begin{array}{r} 1\ 7 \\ 5 \overline{) 8\ 35} \end{array}$		1 (3C7)
6	$\begin{array}{r} 1\ 4\ 2\ 7 \\ +\ 6\ 3\ 5 \\ \hline 2\ 0\ 6\ 2 \\ \hline 1\ 1 \end{array}$		1 (4C2)
7	$6 \times 5 \times 4 = 30 \times 4 = 120$		1 (4C6b)
8	-6		1 (6N5)
9	$\begin{array}{r} 3\ 8\ 9\ 12 \\ -\ 5\ 8\ 3 \\ \hline 3\ 3\ 0\ 9 \end{array}$		1 (4C2)
10	4.5		1 (4F8)
11	10 800		1 (5C1)
12	$7 \times 11 = 77$ So $70 \times 110 = 77 \times 10 \times 10$ $= 7700$		1 (5C6a)
13	8.462		1 (5F8)
14	$\begin{array}{r} 5\ 3\ 4\ 8 \\ \times\ 6 \\ \hline 3\ 2\ 0\ 8\ 8 \\ \hline 2\ 2\ 4 \end{array}$		1 (5C7a)
15	$84 \div 7 = 12$ So $840 \div 7 = 12 \times 10 = 120$		1 (4C6b)
16	2840		1 (5C6b)
17	$\frac{7}{9} - \frac{2}{9} = \frac{7-2}{9} = \frac{5}{9}$		1 (3F4)
18	$\begin{array}{r} 3\ 4\ 1\ 3\ 7\ 2\ 5 \\ -\ 6\ 4\ 1\ 0 \\ \hline 3\ 7\ 3\ 1\ 5 \end{array}$		1 (5F8)
19	$\begin{array}{r} 1\ 5\ 6\ 9 \\ 4 \overline{) 6\ 22\ 27\ 36} \end{array}$		1 (5C7b)
20	$\frac{4}{7}$ of 49 = $(49 \div 7) \times 4$ $= 7 \times 4 = 28$		1 (5F5)
21	$2^3 + 4^2 = 8 + 16 = 24$		1 (6C9)
22	$\begin{array}{r} 1\ 3\ 1\ 2\ 10 \\ -\ 6\ 7\ 4 \\ \hline 7\ 4\ 6 \end{array}$		1 (5F8)
23	$\begin{array}{r} 6\ 8 \\ \times\ 4\ 3 \\ \hline 2\ 0\ 4 \\ 2\ 7\ 2\ 0 \\ \hline 2\ 9\ 2\ 4 \end{array}$	2 marks for the correct answer, otherwise 1 mark for the correct method with no more than one error. Award no marks if the error is the placing of digits in incorrect columns.	2 (6C7a)

Qu.	Requirement	Guidance	Marks (Domain)
24	$\begin{array}{r} 5\ 8\ 16\ 7\ 78\ 12 \\ -\ 3\ 8\ 4\ 2\ 6 \\ \hline 5\ 5\ 8\ 3\ 5\ 6 \end{array}$		1 (5C2)
25	10% of 3500 = $3500 \div 10 = 350$ 20% of 3500 = $350 \times 2 = 700$		1 (6R2)
26	$\begin{array}{r} 2\ 6\ 3 \\ \times\ 4 \\ \hline 1\ 0\ 5\ 2 \\ \hline \end{array}$ So $2.63 \times 4 = 1052 \div 100$ $= 10.52$		1 (6F9b)
27	$\begin{array}{r} 4\ 3 \\ 14 \overline{) 6\ 0\ 2} \\ -\ 5\ 6 \\ \hline 4\ 2 \\ -\ 4\ 2 \\ \hline 0 \end{array}$	2 marks for the correct answer, otherwise 1 mark for a correct method with no more than one error.	2 (6C7b)
28	$\frac{2}{3} + \frac{7}{9} = \frac{6}{9} + \frac{7}{9} = \frac{13}{9}$ or $1\frac{4}{9}$		1 (5F4)
29	$\begin{array}{r} 3\ 5\ 7\ 2 \\ \times\ 5\ 6 \\ \hline 2\ 1\ 4\ 3\ 2 \\ 1\ 7\ 8\ 6\ 0\ 0 \\ \hline 2\ 0\ 0\ 0\ 3\ 2 \\ \hline 1\ 1\ 1 \end{array}$	2 marks for the correct answer, otherwise 1 mark for the correct method with no more than one error. Award no marks if the error is the placing of digits in incorrect columns.	2 (6C7a)
30	$10\% \times 760 = 760 \div 10 = 76$ $5\% \times 760 = 76 \div 2 = 38$ $95\% = 100\% - 5\%$ $= 760 - 38 = 722$		1 (6R2)
31	$\frac{4}{9} \times \frac{5}{7} = \frac{4 \times 5}{9 \times 7} = \frac{20}{63}$		1 (6F5a)
32	$\begin{array}{r} 6\ 5 \\ 36 \overline{) 2\ 3\ 4\ 0} \\ -\ 2\ 1\ 6 \\ \hline 1\ 8\ 0 \\ -\ 1\ 8\ 0 \\ \hline 0 \end{array}$	2 marks for the correct answer, otherwise 1 mark for a correct method with no more than one error.	2 (6C7b)
33	$1\frac{3}{8} \times 7 = \frac{8+3}{8} \times 7$ $= \frac{11}{8} \times 7$ $= \frac{11 \times 7}{8} = \frac{77}{8}$ or $9\frac{5}{8}$		1 (5F5)
34	$2\frac{1}{3} - 1\frac{2}{5} = \frac{7}{3} - \frac{7}{5} = \frac{35}{15} - \frac{21}{15} = \frac{14}{15}$		1 (6F4)
35	$\frac{5}{6} \div 9 = \frac{5}{6 \times 9} = \frac{5}{54}$		1 (6F5b)
36	$24 \div (6 - 3) \times 2 = 24 \div 3 \times 2$ $= 8 \times 2 = 16$		1 (6C9)

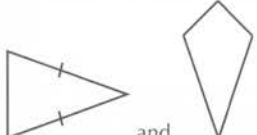
Set A — Answers

Set A Paper 2

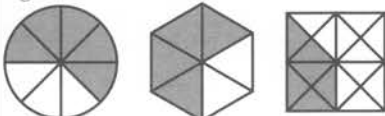
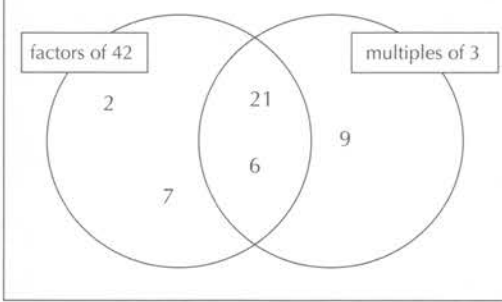
Qu.	Requirement	Guidance	Marks (Domain)
1a	10 cm ²		1 (4M7b)
1b	B and D (both have an area of 7 cm ²)		1 (4M7b)
2	Seventy-two thousand, five hundred and eighty-nine		1 (5N2)
3	360 g ÷ 3 = 120 g		1 (3M2b)
4a	$\frac{7}{10}$ of 40 = (40 ÷ 10) × 7 = 4 × 7 = 28		1 (3F10)
4b	$\frac{8}{40} = \frac{1}{5}$		1 (6F2)
5	1438 ÷ 100 = 14.38 So she divided by 100 .		1 (4F9)
6	$\begin{array}{r} 218 \\ \times 8 \\ \hline 1744 \end{array}$ 1744 ÷ 1000 = 1.744 litres	2 marks for correct answer, otherwise 1 mark for a correct method.	2 (4C7/ 6M5)
7		1 mark for correct horizontal translation, 1 mark for correct vertical translation.	2 (5P2)
8	30 = 2 × 3 × 5 63 = 3 × 3 × 7	1 mark for each correct pair.	2 (5C5b)
9	Distance on map = 4 cm 4 × 50 = 200 m		1 (6R1)
10	E.g. Tariq has knitted 20.5 ÷ 2 = 10.25 cm Henry has knitted 10.25 × 3 = 30.75 cm Total = 20.5 + 10.25 + 30.75 = 61.5 cm	2 marks for correct answer, otherwise 1 mark for a correct method.	2 (5M9b)
11			1 (6R3)
12	Volume of one cube = 3 × 3 × 3 = 27 cm ³ 270 cm ³ ÷ 27 cm ³ = 10 cubes	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6M8a)
13	11.5 × 2 = 23 23 + 7 = 30 cherries in total 30 ÷ 2 = 15 cherries in each bag	2 marks for correct answer, otherwise 1 mark for a correct method.	2 (6C8)

Qu.	Requirement	Guidance	Marks (Domain)
14		2 marks for both lines correct, otherwise 1 mark for one line correct.	2 (5F4)
15a	325 + 32 = 357 m		1 (6N5)
15b	32 + 12 = 44 m		1 (6N5)
16	£30.60 ÷ 3 = £10.20 $\begin{array}{r} £10.20 \\ + £4.90 \\ \hline £15.10 \end{array}$ given away $\begin{array}{r} £20.60 \\ - £15.10 \\ \hline £5.50 \end{array}$ left over	2 marks for correct answer, otherwise 1 mark for a correct method.	2 (5M9a)
17	(8 + 13) ÷ 3		1 (6C9)
18	Total: 62 + 74 + 81 + 56 + 65 + 59 + 67 + 72 = 536 Mean: $\begin{array}{r} 67 \\ 8 \overline{) 536} \\ \underline{48} \\ 56 \\ \underline{56} \\ 0 \end{array}$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6S3)
19	22% = $\frac{22}{100} = \frac{11}{50}$ 50 - 11 = 39 sweets left $\frac{39}{50} = \frac{68}{100} = 68\%$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6R2)
20	People travelling by coach: $\begin{array}{r} 278 \\ \times 43 \\ \hline 834 \\ 11120 \\ \hline 11954 \end{array}$ People travelling by train: $\begin{array}{r} 123014712 \\ - 11954 \\ \hline 8518 \end{array}$	3 marks for the correct answer. Otherwise, 2 marks for calculating how many people came by coach or for a correct method with no more than one error. 1 mark for a correct method with more than one error.	3 (6C8)

Set A Paper 3

Qu.	Requirement	Guidance	Marks (Domain)
1	 and		1 (4G2b)
2	35 + 19 = 54 cards in total 54 ÷ 6 = 9 packs of cards.	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (3C4/3C8)

Set A — Answers

Qu.	Requirement	Guidance	Marks (Domain)
3	4 hours and 15 minutes to 5 hours = 45 minutes 5 hours to 5 hours and 10 minutes = 10 minutes 45 minutes + 10 minutes = 55 minutes		1 (4M4c)
4	Irregular E.g. in a regular polygon, all the angles are the same, but in this polygon the angles are different.	Correct answer and explanation must both be given.	1 (5G2b)
5	0.18, 0.8, 0.818, 1.081, 1.8		1 (5F8)
6a	$200 - 150 = 50$		1 (4S1/4S2)
6b	$1000 - 700 = 300$		1 (4S1/4S2)
7a	From 11:58 to 12:19 is $2 + 19 = 21$ minutes		1 (5S1)
7b	The latest bus she can catch gets into Pireleth at 13:01. This bus leaves Yalton at 12:31 .		1 (5S1)
8	E.g.  2 marks for all three shaded correctly, otherwise 1 mark for two shapes shaded correctly.		2 (4F2)
9	$5 \times 8 = 40$ and $120 \div 2 = 60$. The only square number between 40 and 60 is 49 .		1 (5C5d)
10	$\frac{1}{2} \times 14 \times 6 = 7 \times 6 = 42 \text{ cm}^2$		1 (6M7b)
11	$\begin{array}{r} 245 \\ \times 26 \\ \hline 1470 \\ 4900 \\ \hline 6370 \end{array}$	1 mark for each correct number	2 (6C7a)
12	 2 marks for all five correct answers, otherwise 1 mark for any four correct answers.		2 (5C5a)

Qu.	Requirement	Guidance	Marks (Domain)
13a	Fee = $\pounds 5 \times 4 + \pounds 8 = \pounds 20 + \pounds 8 = \pounds 28$		1 (6A2)
13b	$\pounds 20.50 = \pounds 5 \times \text{number of hours} + \pounds 8$ $\pounds 12.50 = \pounds 5 \times \text{number of hours}$ Number of hours $\begin{array}{r} 250 \\ 5 \overline{) 1250} \\ \underline{100} \\ 250 \\ \underline{250} \\ 0 \end{array}$ So $\pounds 12.50 \div \pounds 5 = 250 \div 100 = 2.5$ hours	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6A2)
14	$9 \times 3 = 27$ slices of watermelon are eaten. So $\frac{27}{12} = \frac{12 + 12 + 3}{12} = 2 \frac{3}{12} = 2 \frac{1}{4}$ watermelons are eaten.		1 (5F2a)
15	$3 \times \pounds 7.25 = \pounds 21.75$ $6 \times \pounds 5 = \pounds 30$ Total: $\pounds 21.75 + \pounds 30 = \pounds 51.75$ Divide by 3 to find how much each adult pays: $\begin{array}{r} 1725 \\ 3 \overline{) 5175} \\ \underline{30} \\ 217 \\ \underline{210} \\ 75 \\ \underline{75} \\ 0 \end{array}$ So $\pounds 51.75 \div 3 = 1725 \div 100 = \pounds 17.25$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (5M9a)
16	E.g. $\bullet + \bullet + \bullet = 81$, so to find the value of \bullet you divide 81 by 3. Then multiply by 5 to find $5 \times \bullet$.		1 (6A1)
17	$60 \text{ g} \div 12 = 5 \text{ g}$ of jam per tart $100 \div 5 = 20$ jam tarts	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6R1)
18a	200 and 50		1 (5C8a)
18b	$2000 \div 1000 = 2$		1 (5C8a)
19	Using vertically opposite angles, the other two angles in the quadrilateral are 62° and 108° . Angles in a quadrilateral add up to 360° , so $x = 360^\circ - 90^\circ - 62^\circ - 108^\circ = 100^\circ$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6G4a/ 6G4b)
20a	$A \times B = 36$ and $A = B + 5$		1 (6A1)
20b	Factor pairs of 36: 1 and 36, 2 and 18, 3 and 12, 4 and 9, 6 and 6. The only pair that have a difference of 5 is 4 and 9. A must be greater than B, so A = 9 and B = 4 .		1 (6A4)
21	$1 - \frac{5}{8} = \frac{3}{8}$ $\frac{3}{8}$ is 27 leaflets, so $\frac{1}{8}$ is $27 \div 3 = 9$ leaflets. So Oliver had $9 \times 8 = 72$ leaflets to give out.	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6R4)

Set B — Answers




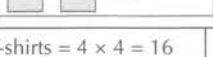



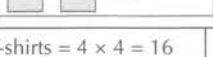



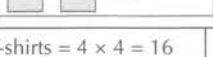
Set B Paper 1

Qu.	Requirement	Guidance	Marks (Domain)
1	48		1 (3C6)
2	1071		1 (4N2b)
3	$\begin{array}{r} 285 \\ + 34 \\ \hline 319 \end{array}$		1 (3C2)
4	0		1 (4C6b)
5	356		1 (3C1)
6	396		1 (4C7)
7	$\begin{array}{r} 32564 \\ + 4178 \\ \hline 36742 \end{array}$		1 (5C2)
8	$\begin{array}{r} 82 \\ \times 4 \\ \hline 328 \end{array}$		1 (3C7)
9	6		1 (6N5)
10	$\begin{array}{r} 29 \\ 3 \overline{)827} \end{array}$		1 (3C7)
11	$\begin{array}{r} 463257 \\ + 58916 \\ \hline 522173 \end{array}$		1 (5C2)
12	$\begin{array}{r} 32756 \\ - 2423 \\ \hline 30333 \end{array}$		1 (5C2)
13	12.342		1 (5F8)
14	$3 \times 2 = 6$ So $300 \times 200 = 6 \times 100 \times 100$ $= 60\,000$		1 (5C6a)
15	$\begin{array}{r} 36.470 \\ + 5.629 \\ \hline 42.099 \end{array}$		1 (5F8)
16	$7^2 - 15 = 49 - 15 = 34$		1 (6C9)
17	$\begin{array}{r} 124 \\ 6 \overline{)71424} \end{array}$		1 (5C7b)
18	14.6		1 (4F8)
19	0.143		1 (5C6b)
20	$8 \times 7 = 56$ So $0.8 \times 7 = 56 \div 10 = 5.6$		1 (6F9b)
21	$72 \div 12 = 6$ So $7200 \div 12 = 6 \times 100 = 600$		1 (4C6b)
22	$\begin{array}{r} 12.5690 \\ - 8.43 \\ \hline 17.57 \end{array}$		1 (4F8)
23	$10\% \times 900 = 900 \div 10 = 90$ $30\% \times 900 = 90 \times 3 = 270$		1 (6R2)

Qu.	Requirement	Guidance	Marks (Domain)
24	$\begin{array}{r} 76 \\ \times 24 \\ \hline 304 \\ 1520 \\ \hline 1824 \end{array}$	2 marks for the correct answer, otherwise 1 mark for the correct method with no more than one error. Award no marks if the error is the placing of digits in incorrect columns.	2 (5C7a)
25	$\frac{3}{5} + \frac{4}{5} = \frac{3+4}{5} = \frac{7}{5}$ or $1\frac{2}{5}$		1 (4F4)
26	$\begin{array}{r} 794 \\ 8 \overline{)6352} \\ \hline \end{array}$ So $63.52 \div 8 = 794 \div 100$ $= 7.94$		1 (6F9c)
27	$14 + 28 \div 7 = 14 + 4 = 18$		1 (6C9)
28	$\begin{array}{r} 243 \\ 16 \overline{)3888} \\ \hline 32 \\ \hline 68 \\ \hline 64 \\ \hline 48 \\ \hline 48 \\ \hline 0 \end{array}$	2 marks for the correct answer, otherwise 1 mark for a correct method with no more than one error.	2 (6C7b)
29	$\frac{15}{16} - \frac{3}{8} = \frac{15}{16} - \frac{6}{16}$ $= \frac{15-6}{16} = \frac{9}{16}$		1 (5F4)
30	$10\% \text{ of } 60 = 60 \div 10 = 6$ $60\% \text{ of } 60 = 6 \times 6 = 36$ $5\% \text{ of } 60 = 6 \div 2 = 3$ $65\% \text{ of } 60 = 36 + 3 = 39$		1 (6R2)
31	$\begin{array}{r} 463 \\ \times 37 \\ \hline 3241 \\ 13890 \\ \hline 17131 \end{array}$	2 marks for the correct answer, otherwise 1 mark for the correct method with no more than one error. Award no marks if the error is the placing of digits in incorrect columns.	2 (6C7a)
32	$\frac{8}{9} \div 4 = \frac{8}{9 \times 4} = \frac{8}{36}$ or $\frac{2}{9}$		1 (6F5b)
33	$\frac{5}{9} \times 360 = (360 \div 9) \times 5$ $= 40 \times 5 = 200$		1 (5F5)
34	$\begin{array}{r} 94 \\ 24 \overline{)2256} \\ \hline 216 \\ \hline 96 \\ \hline 96 \\ \hline 0 \end{array}$	2 marks for the correct answer, otherwise 1 mark for a correct method with no more than one error.	2 (6C7b)
35	$5 \times 2\frac{3}{4} = 5 \times \frac{11}{4}$ $= \frac{5 \times 11}{4} = \frac{55}{4}$ or $13\frac{3}{4}$		1 (5F5)
36	$\frac{3}{5} + 2\frac{1}{2} = \frac{3}{5} + \frac{5}{2}$ $= \frac{6}{10} + \frac{25}{10}$ $= \frac{31}{10}$ or $3\frac{1}{10}$		1 (6F4)

Set B — Answers

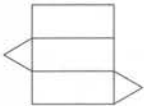
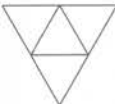
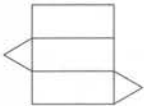
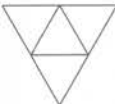
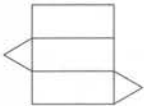
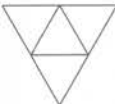
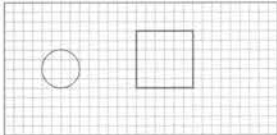
Set B Paper 2

Qu.	Requirement	Guidance	Marks (Domain)								
1	$2 + 6 + 5 + 2 + 7 + 8 = 30$ cm		1 (5M7a)								
2	Tia uses $8 \times 12 = 96$ beads on the bracelets. So she uses $120 - 96 = 24$ beads to make the necklace.	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (3C4/3C8)								
3a	$11 = 4 + 4 + 3 = 2$ full squares + $\frac{3}{4}$ of a square <table border="1"><tr><td>T-shirts</td><td></td></tr><tr><td>Jumpers</td><td></td></tr><tr><td>Skirts</td><td></td></tr><tr><td>Dresses</td><td></td></tr></table>	T-shirts		Jumpers		Skirts		Dresses			1 (3S1)
T-shirts											
Jumpers											
Skirts											
Dresses											
3b	Number of T-shirts = $4 \times 4 = 16$ Number of skirts = $4 + \frac{1}{2} \times 4 = 4 + 2 = 6$ Difference = $16 - 6 = 10$		1 (3S2)								
4a	13:50		1 (4M4b)								
4b	Twenty-five past three is 15:25 in the 24-hour clock format. <div style="display: flex; align-items: center; justify-content: space-around;"><div>13:50</div><div>→ + 10 mins →</div><div>14:00</div><div>→ + 1 hour →</div><div>15:00</div><div>→ + 25 mins →</div><div>15:25</div></div> Time until end of day = 1 hour 35 minutes		1 (5M4)								
5	49° (opposite angles in a parallelogram are equal)		1 (6C4a)								
6	<div style="display: flex; flex-direction: column; align-items: center;"><div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">48</div><div style="display: flex; align-items: center; margin-bottom: 10px;"><div style="border: 1px solid black; padding: 2px; margin-right: 10px;">0.48</div><div style="margin: 0 10px;">← + 10</div><div style="border: 1px solid black; padding: 2px; margin-right: 10px;">4.8</div><div style="margin: 0 10px;">× 10</div><div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">480</div></div></div>	2 marks for three numbers correct, otherwise 1 mark for two numbers correct.	2 (5C6b)								
7	<div style="display: flex; align-items: center; justify-content: center;"><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">1</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">9</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">8</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">2</div></div> <div style="margin: 0 10px;">+</div> <div style="display: flex; align-items: center; justify-content: center;"><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">3</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">3</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">4</div></div> <div style="margin: 0 10px;">=</div> <div style="display: flex; align-items: center; justify-content: center;"><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">2</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">3</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">1</div><div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin: 0 2px;">6</div></div>	2 marks for all four digits correct, otherwise 1 mark for two or three digits correct.	2 (4C2)								
8	25 cm and 40 cm		1 (5M7b)								
9	2 balls weigh $540 \div 3 = 180$ g So the bat weighs $460 - 180 = 280$ g	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (4C8)								
10	27		1 (5C5d)								
11a	680 000		1 (5N4)								
11b	89 557 and 89 628		1 (5N4)								
12a	At 0 minutes the temperature of the ice cream was -18°C . $-18^\circ\text{C} + 10^\circ\text{C} = -8^\circ\text{C}$ The ice cream was -8°C after 15 minutes .		1 (6N5/5S2)								

Qu.	Requirement	Guidance	Marks (Domain)
12b	Temperature at 20 minutes = -6°C Temperature at 30 minutes = 2°C You add 6°C to get from -6°C to 0°C , then add 2°C to get from 0°C to 2°C . So difference = $6^\circ\text{C} + 2^\circ\text{C} = 8^\circ\text{C}$		1 (6N5/5S2)
13	3		1 (6C5)
14	Each scarf costs $\pounds 180 \div 30 = \pounds 6$ $7 \times \pounds 6 = \pounds 42$ Total on Tuesday = $\pounds 180 + \pounds 42 = \pounds 222$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6R1)
15	$0.998 + 0.002 = 1$ $1.25 - 0.7 = 0.55$ $1.25 + 0.55 = 1.8$	1 mark each for 0.002 and 1.8.	2 (5F10)
16	$15.5 \times 2 = 31$ $31 - 4 = 27$ $27 \div 3 = 9$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (5C8b)
17	For every $\pounds 2$ that Kat collects, Sanjeev collects $\pounds 3$, so $\pounds 2 + \pounds 3 = \pounds 5$ is collected each time. This can happen $5 \overline{) 25} 5$ times. So Kat collects $51 \times \pounds 2 = \pounds 102$ and Sanjeev collects $51 \times \pounds 3 = \pounds 153$	2 marks if both amounts are correct, otherwise 1 mark for one correct amount or for a correct method.	2 (6R4)
18a	The x-coordinate of P is 2 less than the x-coordinate of Q. There's a line of symmetry through P, so the x-coordinate of R is 2 less than that of P. So, it's $-5 - 2 = -7$. So coordinates of R = (-7, 0) .		1 (6P2/6P3)
18b	5 to the left of the y-axis becomes 5 to the right after a reflection, so the coordinates are (5, 4) .		1 (6P2/6P3)
19	$1 - \frac{3}{7} - \frac{5}{14} = \frac{14 - 6 - 5}{14} = \frac{3}{14}$		1 (5F4)
20	$\frac{3}{4}$ of 120 = $(120 \div 4) \times 3 = 30 \times 3 = 90$ $\frac{90}{250} = \frac{9}{25} = \frac{36}{100} = 36\%$	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (4F10a/6F11)
21	E.g. $\frac{1}{4} = 2 \times \frac{1}{8}$, so $\frac{1}{4} \times 648 = 2 \times \frac{1}{8} \times 648 = 2 \times 81$		1 (5C8c)

Set B — Answers

Set B Paper 3

Qu.	Requirement	Guidance	Marks (Domain)						
1	<div><div>75</div><div>+25</div><div>100</div><div>+25</div><div>125</div><div>+25</div><div>150</div></div> <div><div>267</div><div>+9</div><div>276</div><div>+9</div><div>285</div><div>+9</div><div>294</div></div>		1 (4N1) 1 (4N1)						
2	<table><tr><th>Net of 3D shape</th><th>Number of vertices of 3D shape</th></tr><tr><td></td><td>6</td></tr><tr><td></td><td>4</td></tr></table>	Net of 3D shape	Number of vertices of 3D shape		6		4		1 (5G3b)
Net of 3D shape	Number of vertices of 3D shape								
	6								
	4								
3			1 (6G5)						
4a	B		1 (5G4a)						
4b	135° (allow answers between 133° and 137°)		1 (5G4c)						
5	<div>41352.86</div> <div>36894.54</div> <div>79285.63</div> <div>23698.25</div> <div>The digit in the tenths place is 5.</div> <div>The digit in the thousands place is 3.</div> <div>The digit in the hundredths place is 6.</div> <div>The digit in the tens place is 8.</div> <div>2 marks for all four correct lines, otherwise 1 mark for two correct lines.</div>		2 (5N3a/ 4F9)						
6a	19 or 61 or 89		1 (5C5c)						
6b	Any of the following: 108, 168, 180, 816, 960		1 (5C5a)						
7a	£16		1 (5F7)						
7b	£15.70		1 (5F7)						
8	The cucumbers cost $4 \times 70p = 280p$ $410p - 280p = 130p$ $130 \div 2 = 65p$ or £0.65	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (4F10b)						
9a	E, H, Z		1 (3G2)						
9b	E, H, T		1 (3G2)						
10	In one day, Elliot will use $3.5 \times 3 = 10.5$ litres So in 4 days, he will use $10.5 \times 4 = 42$ litres	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (5M9d)						
11	1634		1 (5N3b)						
12	Height of parallelogram = height of square = $4 + 8 = 12$ cm Area = $8 \times 12 = 96$ cm ²		1 (6M7b)						
13a	f = 5m		1 (6A1)						
13b	j = $42 \div 7 = 6$		1 (6A1)						

Qu.	Requirement	Guidance	Marks (Domain)
14	Write each fraction with a denominator of 18. $\frac{7}{9} = \frac{14}{18}, \frac{13}{18}, \frac{5}{6} = \frac{15}{18}, \frac{2}{3} = \frac{12}{18}$ In order from smallest to largest: $\frac{2}{3}, \frac{13}{18}, \frac{7}{9}, \frac{5}{6}$		1 (5F3)
15	$2650 \div 10 = 265$ $\begin{array}{r} 265 \\ \times 3 \\ \hline 795 \end{array}$ So they need 795 kg of flour. Find the number of bags: $\begin{array}{r} 397 \\ 2 \overline{) 795} \\ \underline{6} \\ 19 \\ \underline{18} \\ 15 \end{array}$ So they need 398 bags.	2 marks for the correct answer, otherwise 1 mark for finding 795 kg or for a correct method.	2 (5C8c)
16	Size of unlabelled angle inside triangle = $360^\circ - 324^\circ = 36^\circ$ Size of angle p = $180^\circ - 36^\circ - 56^\circ = 180^\circ - 92^\circ = 88^\circ$	2 marks for the correct answer, otherwise 1 mark for finding the missing 36° angle in the triangle.	2 (6G4)
17	6 peaches cost $\begin{array}{r} 45 \\ \times 6 \\ \hline 270 \end{array}$ p So 1 potato costs $\begin{array}{r} 18 \\ 15 \overline{) 270} \\ \underline{15} \\ 120 \\ \underline{120} \\ 0 \end{array}$ = 18p or £0.18	2 marks for the correct answer, otherwise 1 mark for a correct method.	2 (6R4)
18	$1.4 = \frac{14}{10} = \frac{7}{5}$, so the missing number is 7.		1 (6F11)
19	For every 3 tickets, you get 1 free. So the 8 children only pay the cost of 6 tickets. Total cost of tickets = $£16.95 \times 6$ $\begin{array}{r} 1695 \\ \times 6 \\ \hline 10170 \end{array}$ So total cost of tickets = $10170 \div 100 = £101.70$ $\begin{array}{r} 10170 \\ - 10170 \\ \hline 5376 \end{array}$ So total cost of baseball caps = $£53.76$ $\begin{array}{r} 5376 \\ 8 \overline{) 5376} \\ \underline{40} \\ 137 \\ \underline{128} \\ 96 \\ \underline{96} \\ 0 \end{array}$ So each baseball cap costs $672 \div 100 = \textbf{£6.72}$	3 marks for the correct answer, otherwise 2 marks for finding £53.76 or for a correct method with no more than one error, or 1 mark for finding £101.70 or for a correct method with more than one error.	3 (5M9a)
20a	The angle in the lions sector of Zoo 1 is 36° . $\frac{36}{360} = \frac{1}{10} = 10\%$		1 (6S1)
20b	No, he is not correct. E.g. $\frac{120}{360} = \frac{1}{3}$ so there are $\frac{1}{3} \times 90 = 30$ zebras in Zoo 1. $\frac{60}{360} = \frac{1}{6}$ so there are $\frac{1}{6} \times 60 = 10$ zebras in Zoo 2. So there are three times as many zebras in Zoo 1 as Zoo 2.	Correct answer and an explanation must both be given.	1 (6S1)



Key Stage Two

Mathematics

SATS Practice Papers

Pupil-friendly Answers

- Perfect for Key Stage Two pupils
- Can be used to mark their own work
- Or swap with a partner and mark each other's

Set A Paper 1: Arithmetic

Ask your teacher if you're not sure how many marks to give.

1. **1034**

2. **68**

3. **283**

4. **482**

5.
$$\begin{array}{r} 1\ 7 \\ 5 \overline{) 8\ 3\ 5} \end{array}$$

6.
$$\begin{array}{r} 1\ 4\ 2\ 7 \\ +\ 6\ 3\ 5 \\ \hline 2\ 0\ 6\ 2 \\ \text{1}\quad\text{1}\quad\text{2} \end{array}$$

7. $6 \times 5 \times 4 = 30 \times 4 = \mathbf{120}$

8. **-6**

9.
$$\begin{array}{r} 3\ 8\ 8\ 1\ 2 \\ -\ 5\ 8\ 3 \\ \hline 3\ 3\ 0\ 9 \end{array}$$

10. **4.5**

11. **10 800**

12. $7 \times 11 = 77$
So $70 \times 110 = 77 \times 10 \times 10$
= 7700

13. **8.462**

14. Method 1:

$$\begin{array}{r} 5\ 3\ 4\ 8 \\ \times\quad\quad\quad 6 \\ \hline 3\ 2\ 0\ 8\ 8 \\ \text{2}\quad\text{2}\quad\text{4} \end{array}$$

Method 2:

\times	6
5000	30 000
300	1800
40	240
8	48
	32 088

15. $84 \div 7 = 12$
So $840 \div 7 = 12 \times 10 = \mathbf{120}$

16. **2840**

17. $\frac{7}{9} - \frac{2}{9} = \frac{7-2}{9} = \frac{5}{9}$

18.
$$\begin{array}{r} 3\ 1\ 3\ 7\ 2\ 5 \\ -\ 6\ 4\ 1\ 0 \\ \hline 3\ 7\ 3\ 1\ 5 \end{array}$$

19.
$$4 \overline{) 6\ 2\ 2\ 7\ 6}$$

20. $\frac{4}{7}$ of 49 = $(49 \div 7) \times 4$
= $7 \times 4 = 28$

21. $2^3 + 4^2 = 8 + 16 = \mathbf{24}$

22.
$$\begin{array}{r} 1\ 3\ 1\ 1\ 0 \\ -\ 6\ 7\ 4 \\ \hline 7\ 4\ 6 \end{array}$$

23. Method 1:

$$\begin{array}{r} 6\ 8 \\ \times\quad\quad 4\ 3 \\ \hline 2\ 0\ 4 \\ 2\ 7\ 2\ 0 \\ \hline 2\ 9\ 2\ 4 \end{array}$$

Method 2:

\times	40	3
60	2400	180
8	320	24
	2720	204
	2924	

Give **2 marks** if the answer is **2924**.

Give **1 mark** if the answer is wrong but they've tried to use a correct method.

24.
$$\begin{array}{r} 5\ 8\ 1\ 6\ 7\ 8\ 1\ 2 \\ -\ 3\ 8\ 4\ 2\ 6 \\ \hline 5\ 5\ 8\ 3\ 5\ 6 \end{array}$$

25. $10\% \text{ of } 3500 = 3500 \div 10 = 350$
 $20\% \text{ of } 3500 = 350 \times 2 = \mathbf{700}$

26. Method 1:

$$\begin{array}{r} 2\ 6\ 3 \\ \times\quad\quad 4 \\ \hline 1\ 0\ 5\ 2 \\ \text{2}\quad\text{1} \end{array}$$

Method 2:

\times	4
200	800
60	240
3	12
	1052

So $2.63 \times 4 = 1052 \div 100 = \mathbf{10.52}$

27. Method 1:

$$\begin{array}{r} 4\ 3 \\ 14 \overline{) 6\ 0\ 2} \\ -\ 5\ 6 \\ \hline 4\ 2 \\ -\ 4\ 2 \\ \hline 0 \end{array}$$

Method 2:

$$14 \overline{) 6\ 0\ 2}$$

Give **2 marks** if the answer is **43**.

Give **1 mark** if the answer is wrong but they've tried to use a correct method.

28. $\frac{2}{3} + \frac{7}{9} = \frac{6}{9} + \frac{7}{9} = \frac{13}{9}$ or $1\frac{4}{9}$

29. Method 1:

$$\begin{array}{r} 3 5 7 2 \\ \times 5 6 \\ \hline 2 1 4 3 2 \\ 1 7 8 6 0 0 \\ \hline 2 0 0 0 3 2 \\ 1 1 1 \end{array}$$

Method 2:

×	50	6
3000	150 000	18 000
500	25 000	3000
70	3500	420
2	100	12
	178 600	21 432
	200 032	

Give **2 marks** if the answer is **200 032**.
Give **1 mark** if the answer is wrong but they've tried to use a correct method.

30. $10\% \times 760 = 760 \div 10 = 76$
 $5\% \times 760 = 76 \div 2 = 38$
 $95\% = 100\% - 5\%$
 $= 760 - 38 = \mathbf{722}$

31. $\frac{4}{9} \times \frac{5}{7} = \frac{4 \times 5}{9 \times 7} = \frac{20}{63}$

32. Method 1:

$$\begin{array}{r} 6 5 \\ 36 \overline{) 2 3 4 0} \\ \underline{- 2 1 6} \\ 1 8 0 \\ \underline{- 1 8 0} \\ 0 \end{array}$$

Method 2:

$$36 \overline{) 2 3^{23} 4^{18} 0}$$

Give **2 marks** if the answer is **65**.

Give **1 mark** if the answer is wrong but they've tried to use a correct method.

33. $1\frac{3}{8} \times 7 = \frac{8+3}{8} \times 7 = \frac{11}{8} \times 7$
 $= \frac{11 \times 7}{8} = \frac{77}{8}$ or $9\frac{5}{8}$

34. $2\frac{1}{3} - 1\frac{2}{5} = \frac{7}{3} - \frac{7}{5} = \frac{35}{15} - \frac{21}{15} = \frac{14}{15}$

35. $\frac{5}{6} \div 9 = \frac{5}{6 \times 9} = \frac{5}{54}$

36. $24 \div (6 - 3) \times 2 = 24 \div 3 \times 2$
 $= 8 \times 2 = \mathbf{16}$

Set A Paper 2: Reasoning

Ask your teacher if you're not sure how many marks to give.

1a. **10 cm²**

1b. **B and D**
 (both have an area of 7 cm²)
 Give **1 mark** if **both** letters are correct.

2. **Seventy-two thousand, five hundred and eighty-nine**

3. $360 \text{ g} \div 3 = \mathbf{120 \text{ g}}$

4a. $\frac{7}{10}$ of 40 = $(40 \div 10) \times 7 = 4 \times 7 = \mathbf{28}$

4b. $\frac{8}{40} = \frac{1}{5}$

5. $1438 \div 100 = 14.38$
 So she divided by **100**.

6. Method 1:

$$\begin{array}{r} 2 1 8 \\ \times 8 \\ \hline 1 7 4 4 \\ 1 6 \end{array}$$

Method 2:

×	8
200	1600
10	80
8	64
	1744

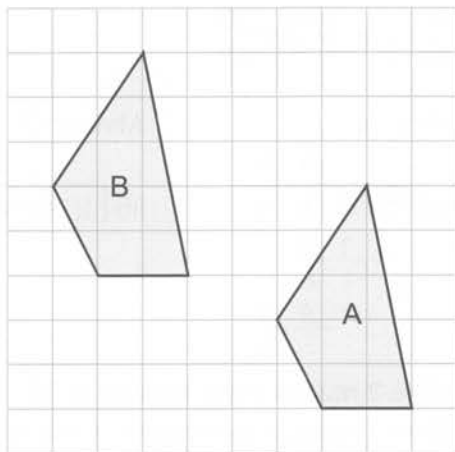
So she uses 1744 ml.

$1744 \div 1000 = \mathbf{1.744 \text{ litres}}$

Give **2 marks** if the answer is **1.744 litres**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

7.

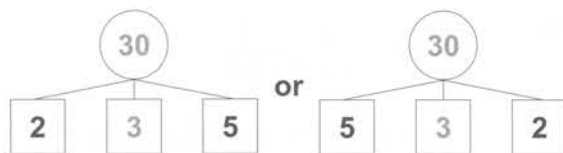


Shape B must be **exactly the same size and shape** as shape A to get any marks.

Give **2 marks** if their shape B is in the correct position.

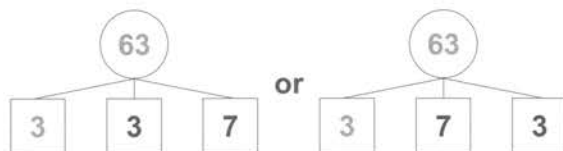
Give **1 mark** if their shape B is in the wrong position, but it is **either 5 squares left** of shape A, **or 3 squares up** from shape A.

8a.



Give **1 mark** if **both** numbers are correct.

8b.



Give **1 mark** if **both** numbers are correct.

9.

Distance on map = 4 cm
 $4 \times 50 = \mathbf{200 \text{ m}}$

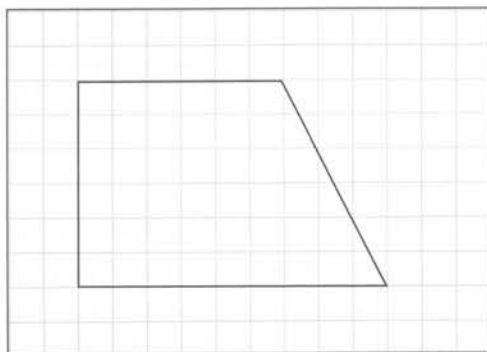
10.

E.g. Tariq has knitted $20.5 \div 2 = 10.25 \text{ cm}$
 Henry has knitted $10.25 \times 3 = 30.75 \text{ cm}$
 Total = $20.5 + 10.25 + 30.75 = \mathbf{61.5 \text{ cm}}$

Give **2 marks** if the answer is **61.5 m**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

11.



12.

Volume of one cube = $3 \times 3 \times 3 = 27 \text{ cm}^3$

$270 \text{ cm}^3 \div 27 \text{ cm}^3 = \mathbf{10 \text{ cubes}}$

Give **2 marks** if the answer is **10**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

13.

There were $11.5 \times 2 = 23$ cherries before Chris made the pie.

There were $23 + 7 = 30$ cherries before Chris ate any.

So there were $30 \div 2 = \mathbf{15}$ cherries in each bag.

Give **2 marks** if the answer is **15**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

14.

$$2\frac{3}{7} + \frac{18}{7} = \frac{17}{7} + \frac{18}{7} = \frac{35}{7} = 5$$

$$1\frac{5}{7} + \frac{23}{7} = \frac{12}{7} + \frac{23}{7} = \frac{35}{7} = 5$$

So the fractions should be matched like this:

$$\begin{array}{r} 2\frac{3}{7} \\ 3\frac{4}{7} \\ 1\frac{1}{7} \\ 1\frac{5}{7} \end{array} \quad \begin{array}{r} 6\frac{6}{7} \\ 8\frac{8}{7} \\ 18\frac{18}{7} \\ 23\frac{23}{7} \end{array}$$

Give **1 mark** for **each** correct pair.

15a.

$$325 + 32 = \mathbf{357 \text{ m}}$$

15b.

$$32 + 12 = \mathbf{44 \text{ m}}$$

16.

Phyllis gives $\pounds 30.60 \div 3 = \pounds 10.20$ to the homeless charity.

The total amount she gives away is:

$$\begin{array}{r} \pounds 10.20 \\ + \pounds 4.90 \\ \hline \pounds 15.10 \end{array}$$

So the amount left over is:

$$\begin{array}{r} \pounds 20.60 \\ - \pounds 15.10 \\ \hline \pounds 5.50 \end{array}$$

Give **2 marks** if the answer is **£15.50**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

17.

$$\mathbf{(8 + 13) \div 3}$$

18. Total marks = $62 + 74 + 81 + 56 + 65 + 59 + 67 + 72 = 536$

Divide by 8 to get the mean:

$$\begin{array}{r} 67 \\ 8 \overline{) 5356} \end{array}$$

Give **2 marks** if the answer is **67**.

Give **1 mark** if the answer is wrong but they've tried to add up all the marks and then divide by 8.

19. $22\% = \frac{22}{100} = \frac{11}{50}$

$$50 - 11 - 5 = 34 \text{ sweets left}$$

$$\frac{34}{50} = \frac{68}{100} = 68\%$$

Give **2 marks** if the answer is **68%**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

20. Multiply to find the number of people travelling by coach:

Method 1:

$$\begin{array}{r} 278 \\ \times 43 \\ \hline 834 \\ 11120 \\ \hline 11954 \end{array}$$

Method 2:

\times	40	3
200	8000	600
70	2800	210
8	320	24
	11 120	834
	11 954	

Subtract from the total to find the number of people travelling by train:

$$\begin{array}{r} 1201472 \\ - 11954 \\ \hline 8518 \end{array}$$

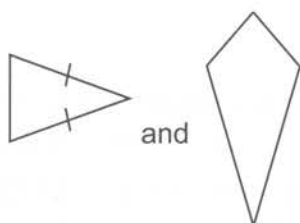
Give **3 marks** if the answer is **8518**.

Give **2 marks** if the answer is wrong but they've tried to multiply and then subtract, or if they've found that 11 954 came by coach. Give **1 mark** if they've only tried to multiply, but didn't get 11 954.

Set A Paper 3: Reasoning

Ask your teacher if you're not sure how many marks to give.

1.



Give **1 mark** if **only** these two shapes have been circled.

2.

$$35 + 19 = 54 \text{ cards in total}$$

$$54 \div 6 = 9 \text{ packs of cards.}$$

Give **2 marks** if the answer is **9**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

3.

$$4 \text{ hours and } 15 \text{ minutes to } 5 \text{ hours}$$

$$= 45 \text{ minutes}$$

$$5 \text{ hours to } 5 \text{ hours and } 10 \text{ minutes}$$

$$= 10 \text{ minutes}$$

$$45 \text{ minutes} + 10 \text{ minutes} = \mathbf{55 \text{ minutes}}$$

4. **Irregular**
E.g. in a regular polygon, all the angles are the same, but in this polygon the angles are different.

Give **1 mark** if they've ticked **Irregular** and given a sensible explanation.

5. **0.18, 0.8, 0.818, 1.081, 1.8**

6a. $200 - 150 = 50$

6b. $1000 - 700 = 300$

7a. From 11:58 to 12:19 is $2 + 19 = 21$ minutes

- 7b. The latest bus she can catch gets into Pireleth at 13:01.
This bus leaves Yalton at **12:31**.

8. **5 parts** of the first shape should be shaded.
4 parts of the second shape should be shaded.
6 parts of the second shape should be shaded.
E.g.



Give **2 marks** if all three shapes have the correct number of parts shaded.

Give **1 mark** if only two shapes have the correct number of parts shaded.

9. $5 \times 8 = 40$ and $120 \div 2 = 60$.

The only square number between 40 and 60 is **49**.

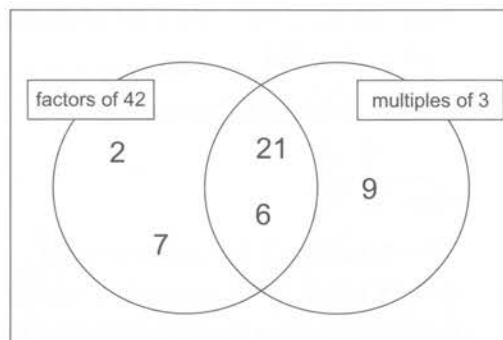
10. $\frac{1}{2} \times 14 \times 6 = 7 \times 6 = 42 \text{ cm}^2$

11.

$$\begin{array}{r}
 \begin{array}{|c|c|c|} \hline 2 & 4 & 5 \\ \hline \end{array} \\
 \times \begin{array}{|c|c|} \hline 2 & 6 \\ \hline \end{array} \\
 \hline
 \begin{array}{|c|c|c|c|} \hline 1 & 4 & 7 & 0 \\ \hline \end{array} \\
 \begin{array}{|c|c|c|c|} \hline 4 & 9 & 0 & 0 \\ \hline \end{array} \\
 \hline
 \begin{array}{|c|c|c|c|} \hline 6 & 3 & 7 & 0 \\ \hline \end{array}
 \end{array}$$

Give **1 mark** for **each** correct number.

12.



Give **2 marks** if all five numbers are in the correct parts of the diagram.

Give **1 mark** if only four numbers are in the correct parts of the diagram.

13a. Fee = $\text{£}5 \times 4 + \text{£}8 = \text{£}20 + \text{£}8$
= £28

13b. $\text{£}20.50 = \text{£}5 \times \text{number of hours} + \text{£}8$
 $\text{£}12.50 = \text{£}5 \times \text{number of hours}$

Divide to find the number of hours.

First divide 1250 by 5:

$$\begin{array}{r}
 250 \\
 5 \overline{) 1250} \\
 \underline{5} \\
 12 \\
 \underline{10} \\
 25 \\
 \underline{25} \\
 0
 \end{array}$$

1250 is 100 times bigger than 12.50.

So $\text{£}12.50 \div \text{£}5 = 250 \div 100 = \textbf{2.5 hours}$

Give **2 marks** if the answer is **2.5 hours**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

14. $9 \times 3 = 27$ slices of watermelon are eaten.

So $\frac{27}{12} = \frac{12 + 12 + 3}{12} = 2 \frac{3}{12} = 2 \frac{1}{4}$
watermelons are eaten.

15. Cost of adult tickets = $3 \times \text{£}7.25 = \text{£}21.75$
Cost of children's tickets = $6 \times \text{£}5 = \text{£}30$
Total = $\text{£}21.75 + \text{£}30 = \text{£}51.75$

Divide to find how much each adult pays.

First divide 5175 by 3:

$$\begin{array}{r}
 1725 \\
 3 \overline{) 5175} \\
 \underline{3} \\
 21 \\
 \underline{21} \\
 07 \\
 \underline{06} \\
 15 \\
 \underline{15} \\
 0
 \end{array}$$

5175 is 100 times bigger than 51.75.

So $\text{£}51.75 \div 3 = 1725 \div 100 = \textbf{£17.25}$

Give **2 marks** if the answer is **£17.25**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

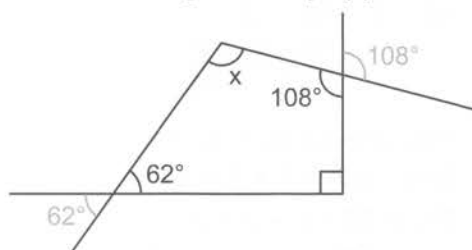
16. E.g. $\bullet + \bullet + \bullet = 81$, so to find the value of \bullet you divide 81 by 3.
Then multiply by 5 to find $5 \times \bullet$.
Give **1 mark** for any sensible explanation.

17. $60 \text{ g} \div 12 = 5 \text{ g}$ of jam per tart
 $100 \div 5 = 20$ jam tarts
Give **2 marks** if the answer is **20**.
Give **1 mark** if the answer is wrong but they've used a sensible method.

- 18a. **200 and 50**
Give **1 mark** if **both** numbers are correct.
The order of the numbers doesn't matter.

- 18b. $2000 \div 1000 = 2$

19. Two of the angles in the quadrilateral can be found using vertically opposite angles:



Angles in a quadrilateral add up to 360° ,
so $x = 360^\circ - 90^\circ - 62^\circ - 108^\circ = 100^\circ$

Give **2 marks** if the answer is **100°**.
Give **1 mark** if the answer is wrong but they've used a sensible method.

- 20a. $A \times B = 36$ and $A = B + 5$
Give **1 mark** if only these two calculations have been circled.

- 20b. Numbers that make $A \times B = 36$ work are factor pairs of 36:
1 and 36, 2 and 18, 3 and 12, 4 and 9, 6 and 6.
Numbers that make $A = B + 5$ work have a difference of 5. The only pair where this is true is 4 and 9.

A must be greater than B,
so **A = 9** and **B = 4**.
Give **1 mark** if **both** A and B are correct.

21. $1 - \frac{5}{8} = \frac{3}{8}$
 $\frac{3}{8}$ is 27 leaflets, so $\frac{1}{8}$ is $27 \div 3 = 9$ leaflets.
So Oliver had $9 \times 8 = 72$ leaflets to start with.

Give **2 marks** if the answer is **72**.
Give **1 mark** if the answer is wrong but they've used a sensible method.

Set B Paper 1: Arithmetic

Ask your teacher if you're not sure how many marks to give.

1. **48**

2. **1071**

3.
$$\begin{array}{r} 285 \\ + 34 \\ \hline 319 \\ 1 \end{array}$$

4. **0**

5. **356**

6. **396**

7.
$$\begin{array}{r} 32564 \\ + 4178 \\ \hline 36742 \\ 1 \quad 1 \end{array}$$

8. Method 1:
$$\begin{array}{r} 82 \\ \times 4 \\ \hline 328 \end{array}$$

Method 2:

\times	4
80	320
2	8
	328

8

9. 6

10.
$$\begin{array}{r} 29 \\ 3 \overline{) 8^2 7} \end{array}$$

11.
$$\begin{array}{r} 463257 \\ + 58916 \\ \hline 522173 \\ \text{1 1 1 1} \end{array}$$

12.
$$\begin{array}{r} 32756 \\ - 2423 \\ \hline 30333 \end{array}$$

13. 12.342

14. $3 \times 2 = 6$
So $300 \times 200 = 6 \times 100 \times 100 = 60\,000$

15.
$$\begin{array}{r} 36.470 \\ + 5.629 \\ \hline 42.099 \\ \text{1 1} \end{array}$$

16. $7^2 - 15 = 49 - 15 = 34$

17.
$$\begin{array}{r} 124 \\ 6 \overline{) 7^1 4^2 4} \end{array}$$

18. 14.6

19. 0.143

20. $8 \times 7 = 56$
So $0.8 \times 7 = 56 \div 10 = 5.6$

21. $72 \div 12 = 6$
So $7200 \div 12 = 6 \times 100 = 600$

22.
$$\begin{array}{r} 2^1 8^5 0^9 10 \\ - 8.43 \\ \hline 17.57 \end{array}$$

23. $10\% \times 900 = 900 \div 10 = 90$
 $30\% \times 900 = 90 \times 3 = 270$

24. Method 1:
$$\begin{array}{r} 76 \\ \times 24 \\ \hline 304 \\ 1520 \\ \hline 1824 \end{array}$$

Method 2:

\times	20	4
70	1400	280
6	120	24
	1520	304
	1824	

Give **2 marks** if the answer is **1824**.
Give **1 mark** if the answer is wrong but they've tried to use a correct method.

25. $\frac{3}{5} + \frac{4}{5} = \frac{3+4}{5} = \frac{7}{5}$ or $1\frac{2}{5}$

26.
$$\begin{array}{r} 794 \\ 8 \overline{) 6^6 3^7 5^3 2} \end{array}$$

So $63.52 \div 8 = 794 \div 100 = 7.94$

27. $14 + 28 \div 7 = 14 + 4 = 18$

28. Method 1:
$$\begin{array}{r} 243 \\ 16 \overline{) 3888} \\ - 32 \\ \hline 68 \\ - 64 \\ \hline 48 \\ - 48 \\ \hline 0 \end{array}$$

Method 2:
$$\begin{array}{r} 243 \\ 16 \overline{) 3^3 8^6 8^4 8} \end{array}$$

Give **2 marks** if the answer is **243**.

Give **1 mark** if the answer is wrong but they've tried to use a correct method.

29.
$$\begin{aligned} \frac{15}{16} - \frac{3}{8} &= \frac{15}{16} - \frac{6}{16} \\ &= \frac{15-6}{16} = \frac{9}{16} \end{aligned}$$

30. $10\% \text{ of } 60 = 60 \div 10 = 6$
 $60\% \text{ of } 60 = 6 \times 6 = 36$
 $5\% \text{ of } 60 = 6 \div 2 = 3$
 $65\% \text{ of } 60 = 36 + 3 = 39$

31. Method 1:
$$\begin{array}{r} 463 \\ \times 37 \\ \hline 3241 \\ 13890 \\ \hline 17131 \end{array}$$

Method 2:

\times	30	7
400	12 000	2800
60	1800	420
3	90	21
	13 890	3241
	17 131	

Give **2 marks** if the answer is **17 131**.

Give **1 mark** if the answer is wrong but they've tried to use a correct method.

32. $\frac{8}{9} \div 4 = \frac{8}{9 \times 4} = \frac{8}{36}$ or $\frac{2}{9}$

33. $\frac{5}{9} \times 360 = (360 \div 9) \times 5 = 40 \times 5 = 200$

34. Method 1:
$$\begin{array}{r} 94 \\ 24 \overline{) 2256} \\ \underline{-2216} \\ 96 \\ \underline{-96} \\ 0 \end{array}$$

Method 2:
$$\begin{array}{r} 94 \\ 24 \overline{) 22^{22}5^96} \\ \underline{-22} \\ 596 \\ \underline{-596} \\ 0 \end{array}$$

Give **2 marks** if the answer is **94**.

Give **1 mark** if the answer is wrong but they've tried to use a correct method.

35.
$$5 \times 2\frac{3}{4} = 5 \times \frac{11}{4} = \frac{5 \times 11}{4} = \frac{55}{4} \text{ or } 13\frac{3}{4}$$

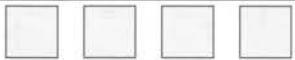



36.
$$\frac{3}{5} + 2\frac{1}{2} = \frac{3}{5} + \frac{5}{2} = \frac{6}{10} + \frac{25}{10} = \frac{31}{10} \text{ or } 3\frac{1}{10}$$

Set B Paper 2: Reasoning

Ask your teacher if you're not sure how many marks to give.

1. $2 + 6 + 5 + 2 + 7 + 8 = \mathbf{30 \text{ cm}}$
2. Tia uses $8 \times 12 = 96$ beads on the bracelets.
So she uses $120 - 96 = \mathbf{24}$ beads to make the necklace.
Give **2 marks** if the answer is **24**.
Give **1 mark** if the answer is wrong but they've used a sensible method.

- 3a. $11 = 4 + 4 + 3$
 $= 2 \text{ full squares} + \frac{3}{4} \text{ of a square}$

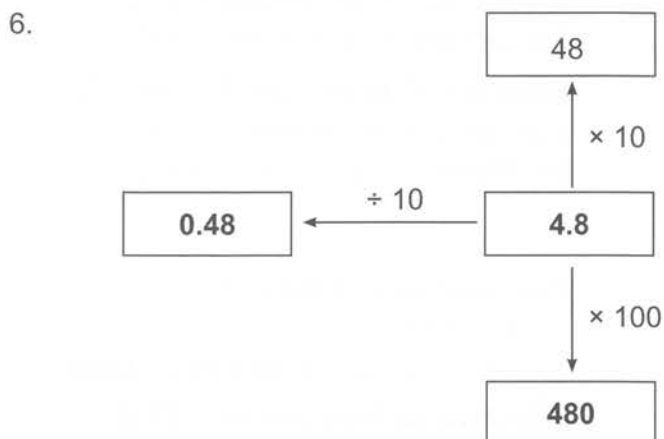
T-shirts	
Jumpers	
Skirts	
Dresses	

- 3b. Number of T-shirts $= 4 \times 4 = 16$
Number of skirts $= 4 + \frac{1}{2} \times 4 = 4 + 2 = 6$
Difference $= 16 - 6 = \mathbf{10}$

- 4a. **13:50**

- 4b. Twenty-five past three is 15:25 in the 24-hour clock format.
- $\xrightarrow{+ 10 \text{ mins}}$
 $\xrightarrow{+ 1 \text{ hour}}$
 $\xrightarrow{+ 25 \text{ mins}}$
- 13:50 14:00 15:00 15:25
- Time until end of day = **1 hour 35 minutes**

5. **49°** (because opposite angles in a parallelogram are equal)



Give **2 marks** if all three boxes are correct.
Give **1 mark** if only two boxes are correct.

7.

$$\begin{array}{r} \textcircled{1} \textcircled{9} \textcircled{8} \textcircled{2} \\ + \quad \textcircled{3} \textcircled{3} \textcircled{4} \\ \hline \textcircled{2} \textcircled{3} \textcircled{1} \textcircled{6} \end{array}$$

Give **2 marks** if all four numbers are correct. Give **1 mark** if only two or three numbers are correct.

8. **25 cm** and **40 cm**
(because $25 \times 40 = 1000$)
Give **1 mark** if **both** are circled.

9. 2 balls weigh $540 \div 3 = 180$ g
So the bat weighs
 $460 - 180 = \mathbf{280}$ g
Give **2 marks** if the answer is **280 g**.
Give **1 mark** if the answer is wrong
but they've used a sensible method.
10. **27**
(because $27 = 3^3$, $27 + 2 = 29$ is a prime
and $27 - 2 = 25 = 5^2$)
- 11a. **680 000**
- 11b. **89 557** and **89 628**
Give **1 mark** if **both** correct numbers
have been circled.
- 12a. At 0 minutes the temperature of the ice
cream was -18°C .
 $-18^\circ\text{C} + 10^\circ\text{C} = -8^\circ\text{C}$
The ice cream was -8°C after
15 minutes.
- 12b. Temperature at 20 minutes = -6°C
Temperature at 30 minutes = 2°C
You add 6°C to get from -6°C to 0°C ,
then add 2°C to get from 0°C to 2°C .
So difference = $6^\circ\text{C} + 2^\circ\text{C} = \mathbf{8^\circ\text{C}}$
13. **3**
14. Each scarf costs $\pounds 180 \div 30 = \pounds 6$
 $7 \times \pounds 6 = \pounds 42$
Total on Tuesday = $\pounds 180 + \pounds 42 = \mathbf{\pounds 222}$
Give **2 marks** if the answer is **£222**.
Give **1 mark** if the answer is wrong
but they've used a sensible method.
15. $1 - 0.998 = 0.002$
The sum of 0.988 and **0.002** is 1.
 $1.25 - 0.7 = 0.55$
 $1.25 + 0.55 = 1.8$
1.25 is halfway between 0.7 and **1.8**.
Give **1 mark** for **0.002** and **1 mark** for **1.8**.
16. $15.5 \times 2 = 31$
 $31 - 4 = 27$
 $27 \div 3 = 9$
Give **2 marks** if the answer is **9**.
Give **1 mark** if the answer is wrong
but they've used a sensible method.
17. For every £2 that Kat collects,
Sanjeev collects £3,
so $\pounds 2 + \pounds 3 = \pounds 5$ is collected each time.
This can happen $255 \div 5$ times:
$$\begin{array}{r} 51 \\ 5 \overline{) 255} \\ \underline{5} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

So Kat collects $51 \times \pounds 2 = \mathbf{\pounds 102}$
and Sanjeev collects $51 \times \pounds 3 = \mathbf{\pounds 153}$
Give **2 marks** if they got both amounts
correct. Give **1 mark** if they got only one
amount correct, or if both amounts are
wrong but they've used a sensible method.
- 18a. The x-coordinate of P is 2 less than the
x-coordinate of Q.
There's a line of symmetry through P,
so the x-coordinate of R is 2 less than
the x-coordinate of P. So, it's $-5 - 2 = -7$.
So coordinates of R = **(-7, 0)**.
- 18b. 5 to the left of the y-axis becomes
5 to the right after a reflection, so the
coordinates are **(5, 4)**.
19. $1 - \frac{3}{7} - \frac{5}{14} = \frac{14 - 6 - 5}{14} = \frac{3}{14}$
20. $\frac{3}{4}$ of 120 = $(120 \div 4) \times 3 = 30 \times 3 = 90$
 $\frac{90}{250} = \frac{9}{25} = \frac{36}{100} = \mathbf{36\%}$
Give **2 marks** if the answer is **36%**.
Give **1 mark** if the answer is wrong
but they've used a sensible method.
21. E.g. $\frac{1}{4} = 2 \times \frac{1}{8}$,
so $\frac{1}{4} \times 648 = 2 \times \frac{1}{8} \times 648 = 2 \times 81$
Give **1 mark** for any sensible explanation.

Set B Paper 3: Reasoning

Ask your teacher if you're not sure how many marks to give.

1. $75 \xrightarrow{+25} 100 \xrightarrow{+25} 125 \xrightarrow{+25} 150$

$267 \xrightarrow{+9} 276 \xrightarrow{+9} 285 \xrightarrow{+9} 294$

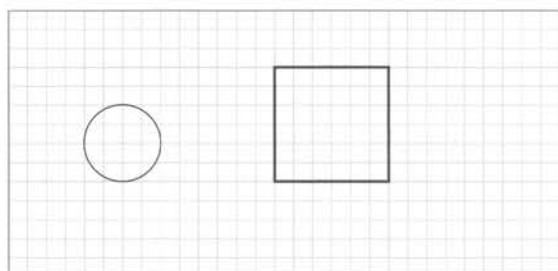
Give **1 mark** for **each** correct diagram.

2.

Net of 3D shape	Number of vertices of 3D shape
	6
	4

Give **1 mark** if **both** numbers are correct.

3. The radius of the circle is 2 units.
So each side of the square should be $2 \times 3 = 6$ units long.



Give **1 mark** for a square with side length 6 units drawn anywhere on the grid.

4a. **B**

4b. **135°**

Give **1 mark** for any answer between 133° and 137° .

5. ~~41352.86~~ The digit in the tenths place is 5.
~~36894.54~~ The digit in the thousands place is 3.
~~79285.63~~ The digit in the hundredths place is 6.
~~23698.25~~ The digit in the tens place is 8.

Give **2 marks** if all 4 lines are correct.

Give **1 mark** if only 2 or 3 lines are correct.

6a. **19 or 61 or 89**

6b. Any of the following:
108, 168, 180, 816 or 960

7a. **£16**

7b. **£15.70**

8. The 4 cucumbers cost:
 $4 \times 70p = 280p$

The 2 peppers cost:
 $410p - 280p = 130p$

So each pepper costs:
 $130 \div 2 = 65p$ or **£0.65**

Give **2 marks** if the answer is **65p** or **£0.65**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

9a. **E, H, Z**

9b. **E, H, T**

10. In one day, Elliot will use
 $3.5 \times 3 = 10.5$ litres
So in 4 days, he will use
 $10.5 \times 4 = 42$ litres

Give **2 marks** if the answer is **42 litres**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

11. **1634**

12. Height of parallelogram = height of square
 $= 4 + 8 = 12$ cm
Area of parallelogram $= 8 \times 12 = 96$ cm²

13a. **f = 5m**

13b. $j = 42 \div 7 = 6$ scarves

14. Write each fraction with a denominator of 18.

$$\frac{7}{9} = \frac{14}{18}, \frac{13}{18}, \frac{5}{6} = \frac{15}{18}, \frac{2}{3} = \frac{12}{18}$$

In order from smallest to largest:

$$\frac{2}{3}, \frac{13}{18}, \frac{7}{9}, \frac{5}{6}$$

15. They have $2650 \div 10 = 265$ lots of 10 eggs.

Multiply by 3 kg to find the amount of flour:

Method 1:

$$\begin{array}{r} 265 \\ \times 3 \\ \hline 795 \\ 11 \end{array}$$

Method 2:

\times	3
200	600
60	180
5	15
	795

So they need 795 kg of flour.

Find the number of bags:

$$\begin{array}{r} 397 \text{ r } 1 \\ 2 \overline{) 795} \end{array}$$

So they need **398** bags.

Give **2 marks** if the answer is **398**.

Give **1 mark** if the answer is wrong but they've used a sensible method, or if they've found that 795 kg of flour is needed.

16. Size of unlabelled angle inside triangle = $360^\circ - 324^\circ = 36^\circ$

$$\begin{aligned} \text{Size of angle } p &= 180^\circ - 36^\circ - 56^\circ \\ &= 180^\circ - 92^\circ = \mathbf{88^\circ} \end{aligned}$$

Give **2 marks** if the answer is **88°**.

Give **1 mark** if the answer is wrong but they worked out that the unlabelled angle is 36° .

17. Find the cost of 6 peaches.

Method 1:

$$\begin{array}{r} 45 \\ \times 6 \\ \hline 270 \\ 3 \end{array}$$

Method 2:

\times	6
40	240
5	30
	270

So 6 peaches cost 270p or £2.70.

Divide by 15 to find the cost of 1 potato.

Method 1:

$$\begin{array}{r} 18 \\ 15 \overline{) 270} \\ \underline{- 15} \\ 120 \\ \underline{- 120} \\ 0 \end{array}$$

Method 2:

$$15 \overline{) 270} = 18$$

So 1 potato costs **18p** or **£0.18**.

Give **2 marks** if the answer is **18p** or **£0.18**.

Give **1 mark** if the answer is wrong but they've used a sensible method.

18. $1.4 = \frac{14}{10} = \frac{7}{5}$, so the missing number is 7.

19. For every 3 tickets, you get 1 free. So the 8 children only pay the cost of 6 tickets. Multiply to find the total cost of the tickets — first find 1695×6 :

Method 1:

$$\begin{array}{r} 1695 \\ \times 6 \\ \hline 10170 \\ 4530 \end{array}$$

Method 2:

\times	6
1000	6000
600	3600
90	540
5	30
	10170

1695 is 100 times bigger than 16.95, so total cost of tickets = $10170 \div 100 = \text{£}101.70$

Total cost of baseball caps:

$$\begin{array}{r} \text{£ } 153.146 \\ - \text{£ } 101.70 \\ \hline \text{£ } 51.446 \end{array}$$

Divide to find the cost of one cap

— first find $51446 \div 8$.

$$\begin{array}{r} 6430 \\ 8 \overline{) 51446} \end{array}$$

51446 is 100 times bigger than 514.46, so each baseball cap costs $6430 \div 100 = \text{£}6.43$

Give **3 marks** if the answer is **£6.43**.

Give **2 marks** if the answer is wrong but they've used a sensible method, or if they found that the total cost of the caps is £51.446. Give **1 mark** if they only found that the total cost of the tickets is £101.70.

- 20a. The angle in the lions sector of Zoo 1 is 36° .

$$\frac{36}{360} = \frac{1}{10} = \mathbf{10\%}$$

- 20b. **No**, he is not correct.

E.g. $\frac{120}{360} = \frac{1}{3}$ so there are $\frac{1}{3} \times 90 = 30$ zebras in Zoo 1.

$$\frac{60}{360} = \frac{1}{6} \text{ so there are } \frac{1}{6} \times 60 = 10 \text{ zebras in Zoo 2.}$$

So there are three times as many zebras in Zoo 1 as Zoo 2.

Give **1 mark** if they've ticked **No** and given a sensible explanation.