

Practice National Curriculum Test

Key stage 2

Mathematics

Paper 2: reasoning

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

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

Questions and answers

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

Follow the instructions for each question.

Work as quickly and as carefully as you can.

If you need to do working out, you can use the space around the question.

Some questions have a method box like this:

Show
your
method

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

If you cannot do a question, **go on to the next one.**

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

If you finish before the end, **go back and check your work.**

Marks

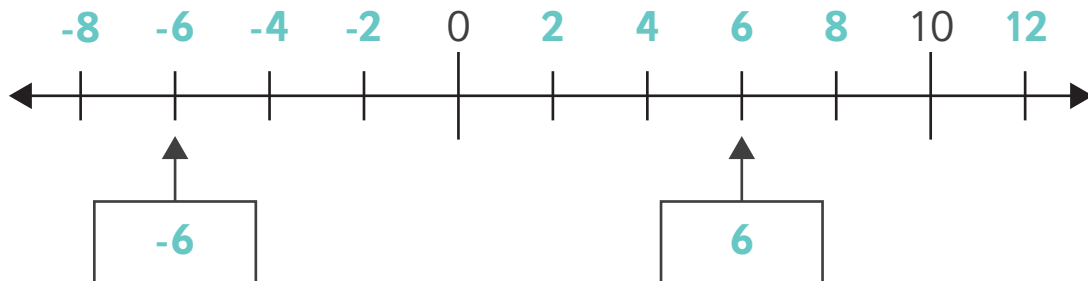
The number under each box at the side of the page tells you the number of marks available for each question.

1

Here is part of a number line.

Write the missing numbers in the boxes.

Each interval is 2



1 mark

2

Books are sold in boxes of 8.

There are 30 children in Year 6. Each child needs 1 book.

How many boxes must they buy?

1 box of 8 = 8

2 boxes of 8 = 16

3 boxes of 8 = 24

4 boxes of 8 = 32

To have enough for
30 children, they
must buy 4 boxes
of books.

4

1 mark

Bookmarks are sold in packs of 12.

Year 6 buy 3 packs.

How many bookmarks will they have left over?

$12 \times 3 = 36$

So, they have 36 bookmarks altogether.

There are 30 children.

6

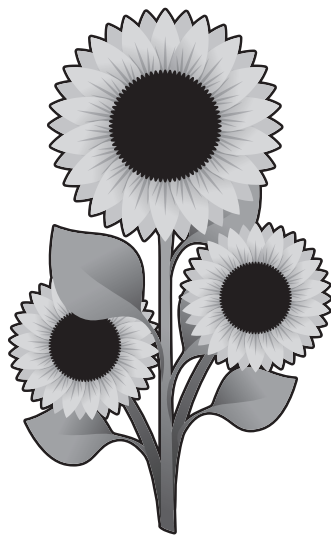
1 mark

$36 - 30 = 6$



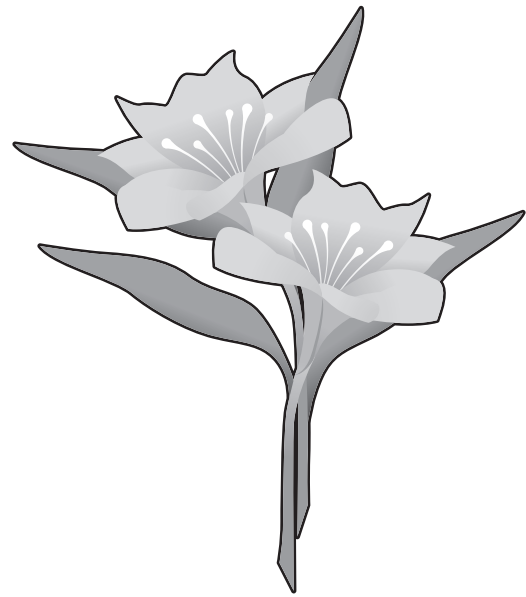
3 Amy buys one bunch of sunflowers and one bunch of daffodils.

She pays with a £5 note.



sunflowers

£1.45



daffodils

£1.20

How much change does Amy get?

Show your method	Sunflowers = £1.45												Daffodils = £1.20												Change from £5											
	$ \begin{array}{r} 1.45 \\ + 1.20 \\ \hline 2.65 \end{array} $												$ \begin{array}{r} 45 \overset{9}{\cancel{10}} 10 \\ + 2.65 \\ \hline 2.35 \end{array} $												<div>£ 2.35</div>											

☐ 1 mark

4 Shen is working out how long he spends on homework every week.

From Monday to Friday, he does homework from 7:30am to 8:00am and from 3:50pm to 4:45pm.

He does no homework at the weekend.

What is the total time Shen spends on his homework every week?

Show your method	7:30 to 8:00 = 30 minutes	Monday to Friday = 5 days
	3:50 to 4:45 = 55 minutes	
		$85 \times 5 = 425$ minutes
	$30 + 55 = 85$ minutes a day	$425 \div 60 = 7 \text{ r } 5$
		= 7 hours and 5 minutes
		7 hours 5 minutes

☐ 2 marks



$$45 + 10 = 55$$

$$\begin{array}{r} 007\text{r}5 \\ 60 \overline{) 425} \end{array}$$

5

The vertices of a quadrilateral have these coordinates.

(2, 7)

(-1, 3)

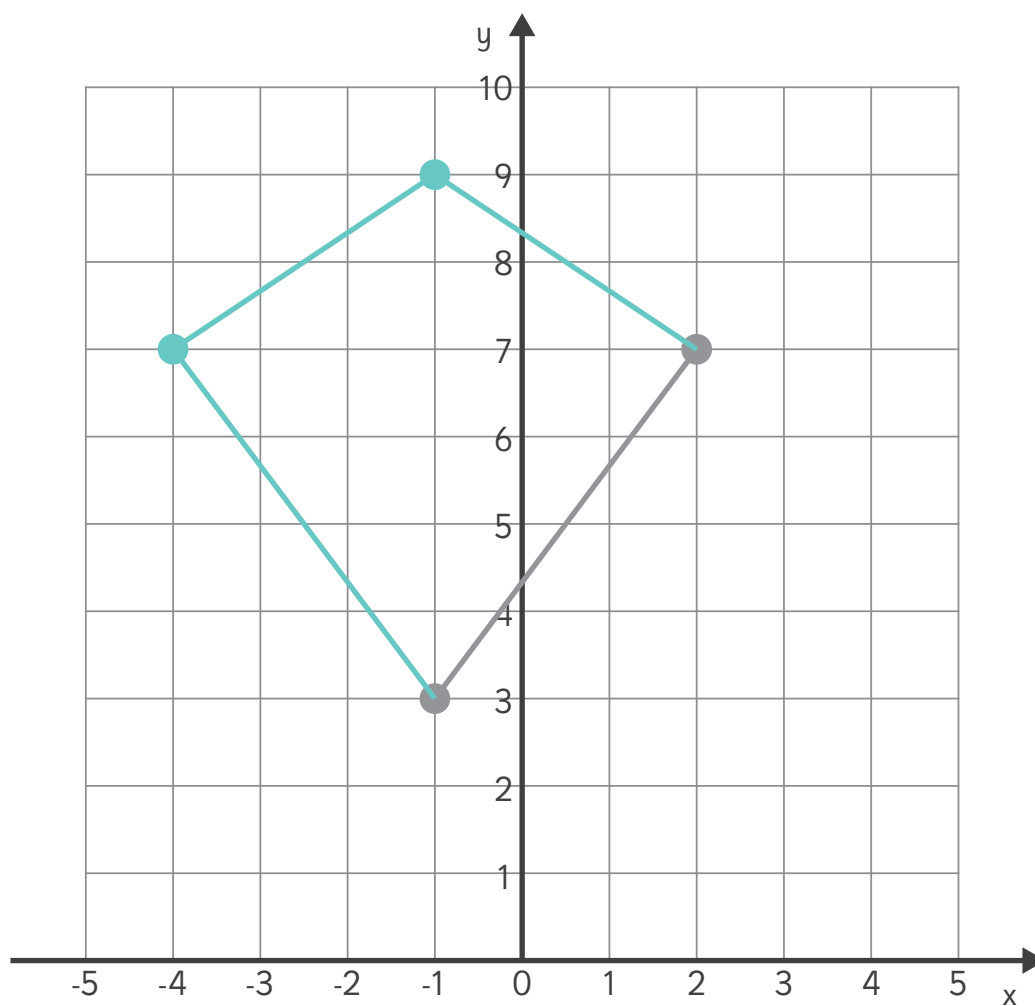
(-4, 7)

(-1, 9)

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

Complete the quadrilateral.

Use a ruler.



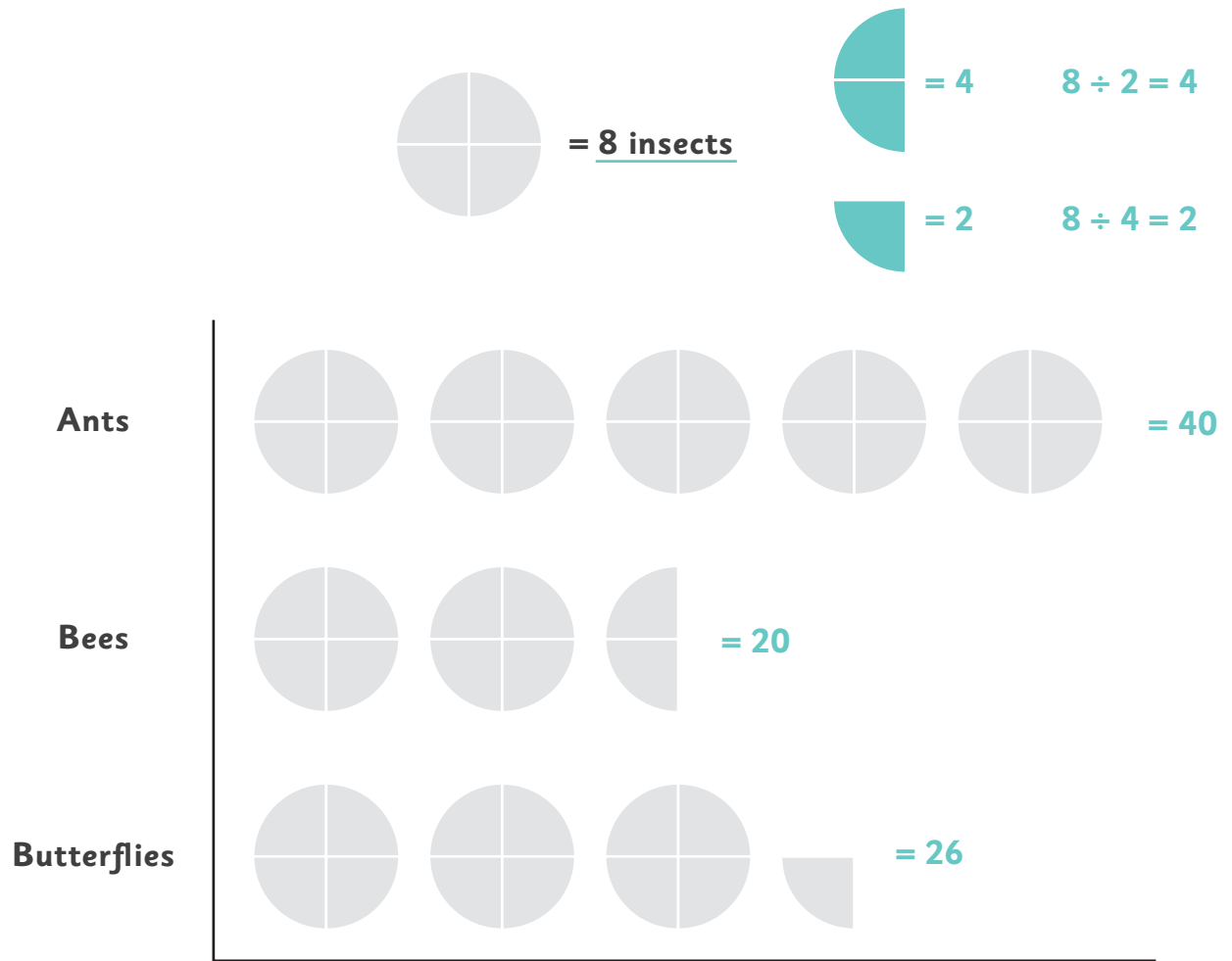
1 mark



6

Inaya is looking for insects in her garden.

She makes a pictogram to show the different insects she found.



How many more butterflies did she see than bees?

$$26 - 20 = 6$$

6



1 mark



7

Write the symbol $<$, $>$ or $=$ in each box to make the statements correct.

$$4 \times 8$$

$$4 \times 8 = 32$$

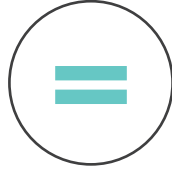


$$35 - 5$$

$$35 - 5 = 30$$

$$48 \div 8$$

$$48 \div 8 = 6$$



$$3 + 3$$

$$3 + 3 = 6$$

$>$ means greater than

$<$ means less than

$=$ means equal to



1 mark

8

Here is part of a number sequence.

The numbers decrease by the same amount each time.

$$\begin{array}{r} 1 \ 4 \ 5 \\ - \ 1 \ 1 \ 0 \\ \hline 3 \ 5 \end{array}$$



Circle **all** the numbers below that would appear in the sequence.

-30

75

10

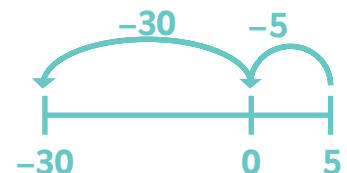
40

95

$$\begin{array}{r} 1 \ 1 \ 0 \\ - \ 3 \ 5 \\ \hline 7 \ 5 \end{array}$$

$$\begin{array}{r} 7 \ 5 \\ - \ 3 \ 5 \\ \hline 4 \ 0 \end{array}$$

$$\begin{array}{r} 4 \ 0 \\ - \ 3 \ 5 \\ \hline 0 \ 5 \end{array}$$



1 mark



9

Tick the numbers that round to **three million** when rounded to the nearest million.

3,104,251



2,711,150



2,116,000



3,365,210



3,901,000



Rounding to 1,000,000 - will the millions digit change?

We need to look at the hundred thousands digit.

If it is 5 or greater, then we round the millions digit up.

If it is 4 or less, then the millions digit stays the same.



1 mark

10

Write the number that is **ten thousand more** than 490,321?

$$\begin{array}{r}
 490321 \\
 + \quad 10000 \\
 \hline
 500321 \\
 \hline
 1
 \end{array}$$

500,321



1 mark

Write the number that is **one thousand less** than 490,321?

$$\begin{array}{r}
 490321 \\
 - \quad 1000 \\
 \hline
 489321 \\
 \hline
 \end{array}$$

489,321

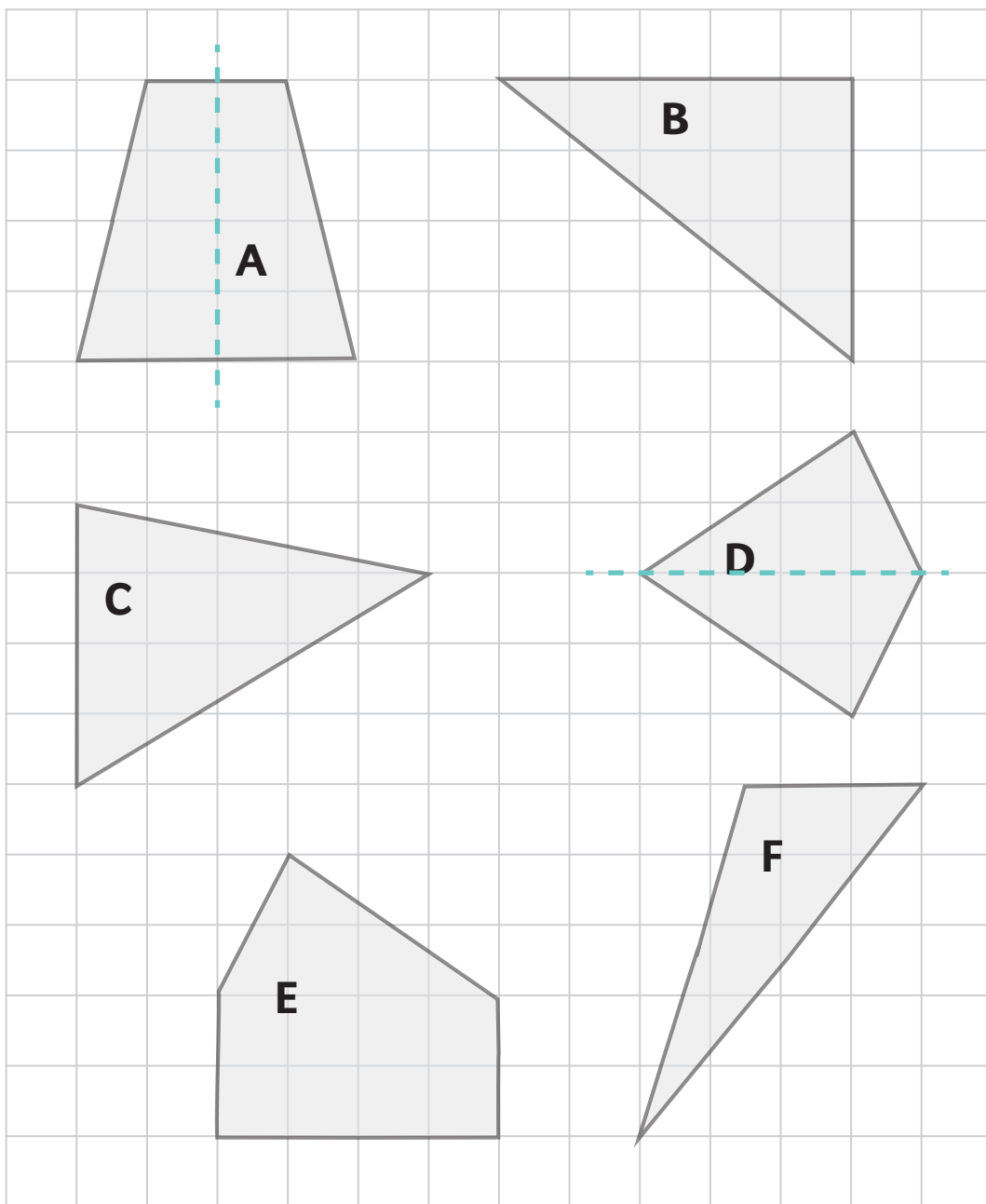


1 mark



11

Here are some shapes drawn on a square grid.



Write the letters of two shapes which have a line of symmetry.

A and D



1 mark

12

Circle the two fractions below that are equivalent.

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

In its
simplest
form

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

In its
simplest
form

$$\frac{4}{12}$$

$$\frac{1}{3}$$

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

In its
simplest
form

$$\frac{1}{3}$$

In its
simplest
form

$$\frac{5}{12}$$

In its
simplest
form

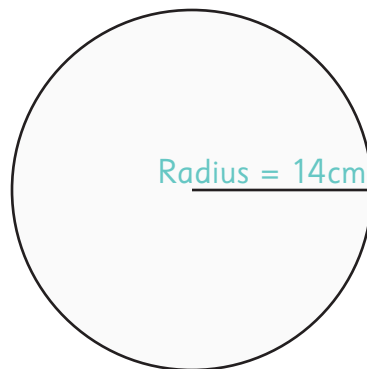


1 mark

13

This diagram below shows a circle.

The distance from the centre to the edge of the circle is 14cm.



What is the diameter of the circle?

**Radius is the distance from
the centre to the outside edge.**

Diameter = radius x 2

$$14 \times 2 = 28 \text{ cm}$$

28 cm



1 mark



14

At a restaurant, 8 pizzas cost £128.

Each pizza costs the same.

How much would 11 pizzas cost?

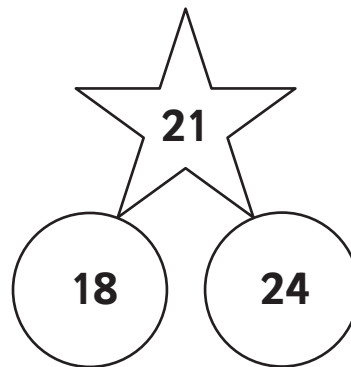
Show your method	8 pizzas cost £128				11 pizzas cost																										
	1 pizza costs £16																														
	0 1 6				x				1 6																						
	8 1 2 8								1 1																						
									1 6																						
									1 6 0																						
									1 7 6																						
																£ 176															

1 mark

15

The diagram below follows the rule:

“The star is found by halving the sum of the circles.”



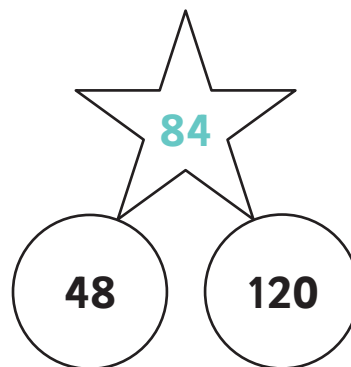
Use the information above to fill in the missing numbers.

Sum = addition

$$\begin{array}{r} 120 \\ + \quad 48 \\ \hline 168 \end{array}$$

Half = divide by 2

$$\begin{array}{r} 84 \\ 2 \overline{)168} \end{array}$$



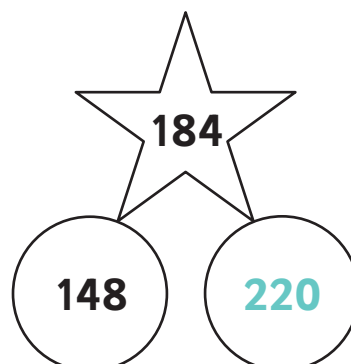
1 mark

Inverse of divide by 2 = multiply by 2

$$\begin{array}{r} 184 \\ \times \quad 2 \\ \hline 368 \\ \hline 1 \end{array}$$

Inverse of addition = subtraction

$$\begin{array}{r} 368 \\ - 148 \\ \hline 220 \end{array}$$



1 mark



16

Here is a rule for the cost of a taxi journey.

$$\text{Cost} = 70\text{p for each mile} + \text{£}4.50$$

A journey is 5 miles.

How much does it cost?

$$5 \text{ miles} = 70\text{p} \times 5$$

$$7 \times 5 = 35$$

$$70 \times 5 = 350\text{p} = \text{£}3.50$$

$$\text{£}3.50 + \text{£}4.50 = \text{£}8.00$$

£ 8.00

1 mark

17

One box can hold 21 oranges.

How many boxes are needed to hold 252 oranges?

12

1 mark

1 box holds 21 oranges

OR

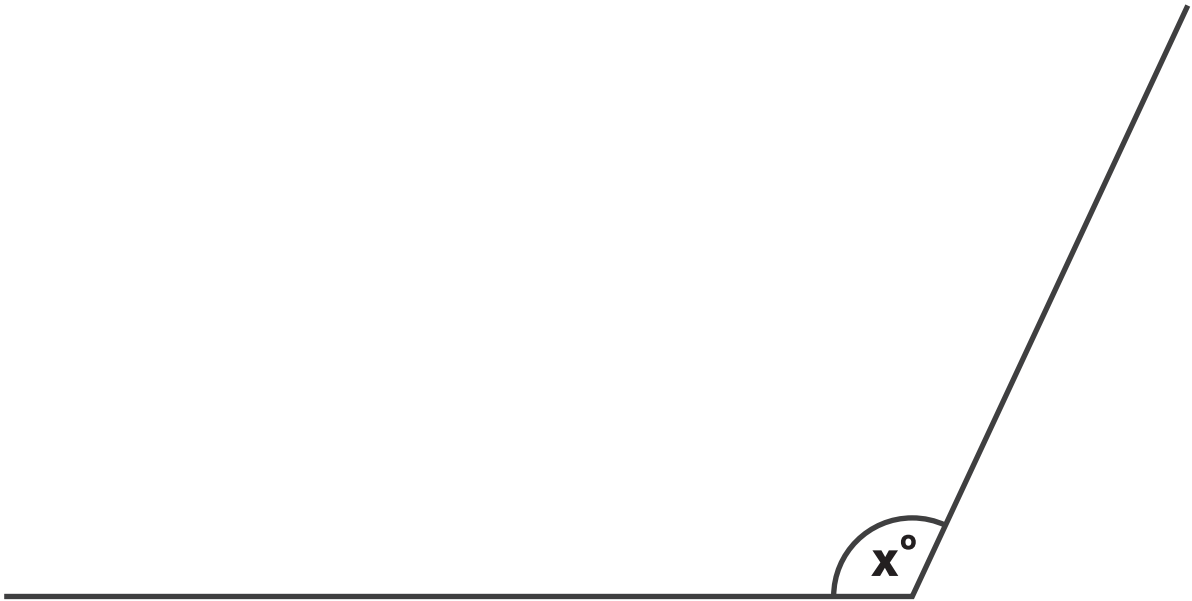
$$3 \times 7 = 21$$

$$\begin{array}{r} 012 \\ 21 \overline{)252} \\ \underline{-21} \\ 42 \\ \underline{42} \\ 0 \end{array}$$

$$\begin{array}{r} 84 \\ 3 \overline{)252} \\ \underline{24} \\ 12 \\ \underline{21} \\ 12 \\ \underline{21} \\ 0 \end{array}$$

$$\begin{array}{r} 12 \\ 7 \overline{)84} \\ \underline{7} \\ 14 \\ \underline{14} \\ 0 \end{array}$$





Measure angle x .

Accept answers in the range 113 to 117 inclusive.

115°

Use your angle measurer.

Line 0 up with one side of the angle.

Make sure you read up from 0

Count up in 10s to 110

How many more degrees over 110? 5

How many degrees is the angle? 115

19

Here are three fraction cards.

Write as
decimals

0.66

0.5

0.75

OR

 $\frac{2}{3}$ $\frac{1}{2}$ $\frac{3}{4}$ Write as
fractions with
the same
denominator $\frac{8}{12}$ $\frac{6}{12}$ $\frac{9}{12}$

Place each card below to make this statement correct.

 $\frac{3}{4}$

>

 $\frac{2}{3}$

>

 $\frac{1}{2}$ ☐

1 mark

20

Circle the improper fraction equivalent to $2\frac{4}{5}$. $\frac{24}{5}$ $\frac{6}{5}$ $\frac{14}{5}$ $\frac{26}{5}$ $\frac{12}{5}$ $\frac{28}{5}$ ☐

1 mark

$$2 \times 5 = 10$$

$$10 + 4 = 14$$

 $\frac{14}{5}$

Numerator is 14

Denominator stays the same



21

Amy builds a tower with 3 blue blocks and 5 yellow blocks.

What fraction of her tower is blue?
Give your answer in its simplest form.

$$3 + 5 = 8 \text{ blocks altogether}$$

3 blue blocks
8 blocks altogether

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

1 mark

Amy adds one more blue block and one more yellow block to her tower.

What fraction of her tower is blue?
Give your answer in its simplest form.

$$\text{Blue blocks} = 3 + 1 = 4$$

$$\text{Yellow blocks} = 5 + 1 = 6$$

$$4 + 6 = 10 \text{ blocks altogether}$$

4 blue blocks

10 blocks altogether

$$\frac{4}{10} = \frac{2}{5}$$

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

1 mark

22

Abdul is thinking of a number.

He says,

“14% of my number is 168.”

What is Abdul's number?

$$14\% = 168$$

$$1\% = 12$$

$$100\% = 1,200$$

$$\begin{array}{r} 012 \\ 14 \overline{) 168} \\ \underline{- 14} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

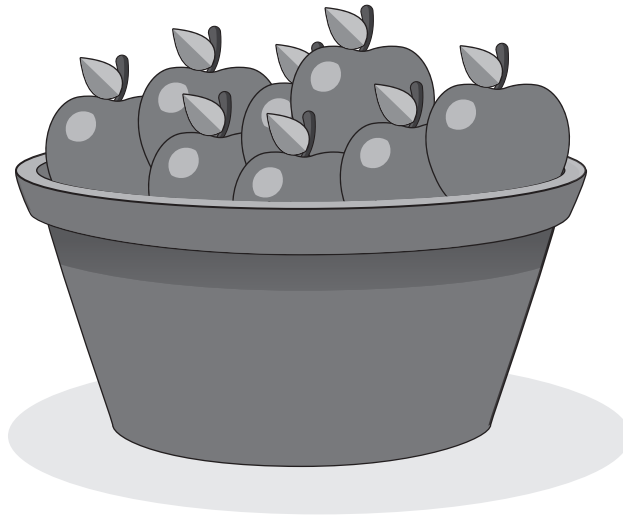
1,200

1 mark



23

Sarah has a bowl of apples.



The bowl itself weighs 250 g.

Altogether they weigh 1.27 kg.

There are 12 apples.

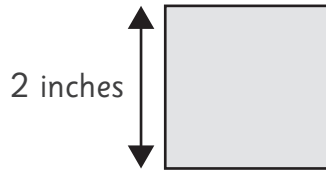
What is the mass of one apple?

Show your method	Total weight:										Weight of 12 apples: 1,020g									
	1.27 kg = 1,270 g										Weight of 1 apple: $1,020 \div 12 =$									
	Weight without bowl:										0 0 8 5									
	1,270 - 250 = 1,020 g										1 2 1 0 2 0									
											85 g									

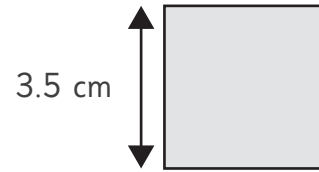
2 marks

Ben and Nadia are building towers out of blocks.

Ben uses these blocks:



Nadia uses these blocks:



This is Ben's tower.



This is Nadia's tower.



Use $2.5\text{cm} \approx 1\text{ inch}$

What is the difference in height between their towers in cm?

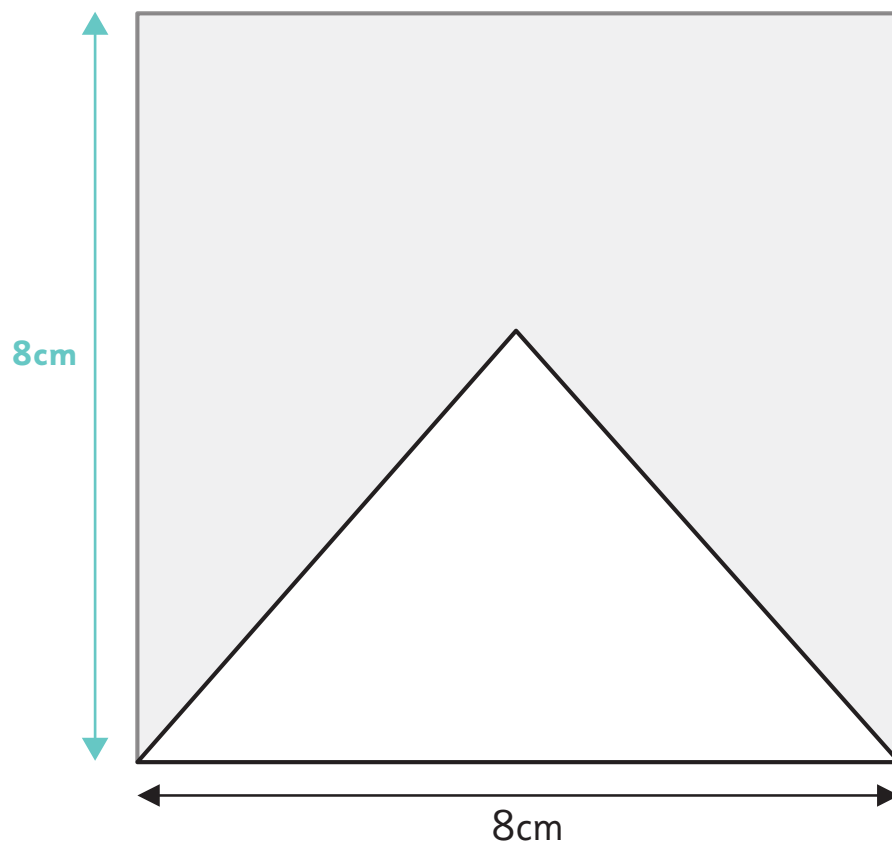
Ben's block in cm		Ben's tower		Nadia's tower	
inch	cm	$5 \times 5 = 25\text{ cm}$		3.5	
$\times 2$ (1)	2.5 (x2)			\times	6
2	5			2	1.0
Ben's block is 5 cm		Difference in height			
		25			
		$- 21$			
		4		4 cm	

☐ 2 marks

25

Here is a triangle inside a square.

The triangle is **half** the height of the square.



Calculate the **area** of the shaded part of the shape.

Show your method	<u>Area of square</u>	<u>Shaded area</u>
	$8 \times 8 = 64 \text{ cm}^2$	$64 - 16 = 48 \text{ cm}^2$
	<u>Triangle</u>	
	$\text{Height of triangle} = 8 \div 2 = 4$	
	$4 \times 8 = 32$	
	$32 \div 2 = 16 \text{ cm}^2$	
		48 cm ²

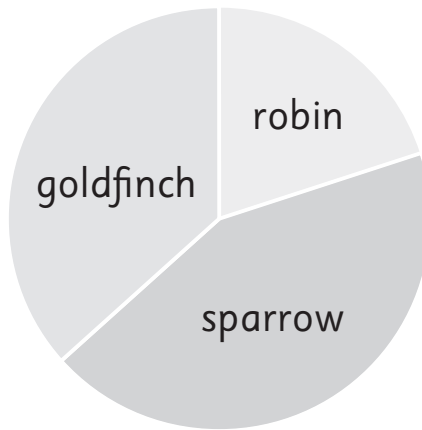


2 marks



26

Inaya makes a pie chart showing the birds in her garden.



Complete the table to work out the size of each angle on the pie chart.

	Number of birds	Size of angle on pie chart
Goldfinch	10	120 °
Robin	11	132 °
Sparrows	9	108 °

$$10 \times 12 = 120$$

$$11 \times 12 = 132$$

$$9 \times 12 = 108$$

$$\text{Total} = 30 \quad \xrightarrow{\times 12} \quad 360$$

Inaya sees 6 more sparrows in her garden.



1 mark

Calculate the size of the segment for **sparrows** on the new pie chart.

Show your method	$9 + 6 = 15$	$10 + 11 + 15 = 36$
	The total number of birds is now 36	
	$36 \times 10 = 360$	
	$15 \times 10 = 150$	
		150 °



1 mark

