ACHIEVE

The higher score

Year 6

Mathematics

SATs Question Workbook

Steph King
& Sarah-Anne Fernandes

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The answers can be found in a pull-out section in the middle of this book.

Welcome to Achieve Mathematics: The Higher Score – Question Workbook

In this book you will find lots of practice and information to help you achieve the higher score in the Key Stage 2 Mathematics tests. You will look again at some of the same key knowledge that was in Achieve Mathematics: The Expected Standard – Question Workbook, but you will use it to tackle trickier questions and apply it in more complex ways.

About the Key Stage 2 Mathematics National Tests

The tests will take place in the summer term in Year 6. They will be done in your school and will be marked by examiners – not by your teacher.

There are three papers to the tests:

Paper 1: Arithmetic – 30 minutes (40 marks)

- These questions assess confidence with a range of mathematical operations.
- Most questions are worth 1 mark. However, 2 marks will be available for long multiplication and long division questions.
- It is important to show your working – this may gain you a mark in questions worth 2 marks, even if you get the answer wrong.

Papers 2 and 3: Reasoning – 40 minutes (35 marks) per paper

- These questions test mathematical fluency, solving mathematical problems and mathematical reasoning.
- Most questions are worth 1 or 2 marks. However, there may be one question with 3 marks.
- There will be a mixture of question types, including multiple-choice, true/false or yes/no questions, matching questions, short responses such as completing a chart or table or drawing a shape, or longer responses where you need to explain your answer.
- In questions that have a method box it is important to show your method – this may gain you a mark, even if you get the answer wrong.

You will be allowed to use: a pencil/black pen, an eraser, a ruler, an angle measurer/protractor and a mirror. You **are not allowed** to use a calculator in any of the test papers.

Test techniques

Before the tests

- Try to revise little and often, rather than in long sessions.
- Choose a time of day when you are not tired or hungry.
- Choose somewhere quiet so you can focus.
- Revise with a friend. You can encourage and learn from each other.
- Read the 'Top tips' throughout this book to remind you of important points in answering test questions.

During the tests

- READ THE QUESTION AND READ IT AGAIN.
- If you find a question difficult to answer, move on; you can always come back to it later.
- Always answer a multiple-choice question. If you really can't work out an answer, try to think of the most sensible response and read the question again.
- Check to see how many marks a question is worth. Have you written enough to 'earn' those marks in your answer?
- Read the question again after you have answered it. Make sure you have given the correct number of answers within a question, e.g. if there are two boxes for two missing numbers.
- If you have any time left at the end, go back to the questions you have missed.

Where to get help:

- **Pages 6–7** practise number and place value.
- **Pages 8–17** practise number – addition, subtraction, multiplication and division.
- **Pages 18–26** practise number – fractions, decimals and percentages.
- **Pages 27–30** practise ratio and proportion.
- **Pages 31–34** practise algebra.
- **Pages 35–43** practise measurement.
- **Pages 44–45** practise geometry – properties of shapes.
- **Pages 46–51** practise geometry – position and direction.
- **Pages 52–58** practise statistics.

The answers can be found in a pull-out section in the middle of this book.

Place value

To achieve the higher score, you need to:

★ know the **place value** of numbers up to 10,000,000 with up to three **decimal places**.

1 Write the value of the digit **6** in these numbers.

4,264,000 _____ 505.362 _____ 0.576 _____

1 (1 mark)

2 Circle the **two** numbers that sum to 8,500,000

2,132,000 700,000 1,500,000 6,368,000 2,232,000

2 (1 mark)

3 Tick (✓) the statement that is **not** true. Tick **one**.

The digit **8** in 483,723 has the value **80,000** ☐

The digit **1** in 2,107,225 has the value **ten thousand**. ☐

The digit **9** in 789,888 has the value **9,000** ☐

The digit **4** in 2.354 has the value **four thousandths**. ☐

3 (1 mark)

4 3 0 4 1 5

Use four of these cards to make a four-digit **multiple of 10** that is **less than** 3,000

Find two different ways to do this.

☐☐☐☐ and ☐☐☐☐

4 (1 mark)

5 Write the **third odd number** that can be placed on the shaded part of this number line. ☐

5 (1 mark)

Top tip

- Work out the scale on the number line first and label any points you know.

/ 5

Total for this page

Addition and subtraction

To achieve the higher score, you need to:
★ solve multi-step addition and subtraction problems, deciding which operations and methods to use and why.

1 Complete this sequence.

2,325 4,793 7,261 ☐ ☐

1 (1 mark)

2 23,782 + ☐ = 41,509 – 13,256

2 (1 mark)

3 Fill in the missing digits.

$$\begin{array}{r} 5\ 7\ 2\ \square\ 3 \\ -\ 2\ \square\ 7\ 4\ \square \\ \hline 3\ 3\ 5\ 2\ 9 \end{array}$$

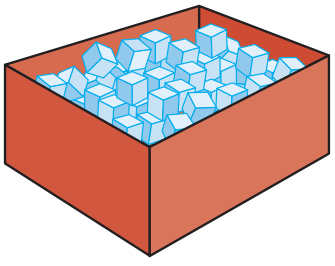
3 (1 mark)

4 A small swimming pool holds 162,000 litres of water.
The pool will be filled over three days.
Complete the table.

Day 1	Day 2	Day 3
59,865 litres	59,865 litres	litres

4 (1 mark)

5 a) Ben has a box of **150** cubes.
He uses some of the cubes to build a tower.
98 cubes are left over.
How many cubes has he used? ☐



5a (1 mark)

b) Seb has **98** cubes left over.
He builds two more towers.
One tower uses **23** cubes and the other uses **19** cubes.
How many of his **98** cubes has he got left now? ☐

5b (2 marks)

Top tip

- Remember to line up digits with the same value when using the column method.

/7
Total for this page

Ordering fractions

To achieve the higher score, you need to:
★ compare and order **fractions**, including fractions greater than 1.

1 Write the symbol **<**, **>** or **=** to make these statements **true**.

$1\frac{5}{8}$ ☐ $1\frac{4}{7}$ $\frac{6}{9}$ ☐ $\frac{2}{3}$ $2\frac{9}{10}$ ☐ $2\frac{5}{6}$

1 (2 marks)

2 A triangle is $\frac{7}{12}$ of the area of a rectangular flag.

A circle is $\frac{5}{9}$ of the area of another rectangular flag of the same size.

Which shape covers the greatest area? Tick (✓) your answer.

triangle ☐ circle ☐

2 (1 mark)

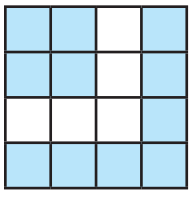
3 Order these cards starting with the **smallest** fraction.

$\frac{7}{8}$	$\frac{5}{12}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{4}{5}$

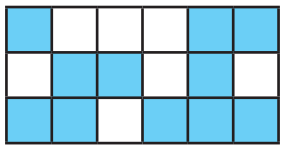
smallest **largest**

3 (1 mark)

4 The shaded areas represent fractions of each shape.



A



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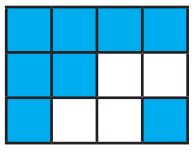


C

Write the letters in order starting with the **largest** fraction.

☐ ☐ ☐

largest **smallest**

4 (1 mark)

Top tip

- Use equivalent fractions to make denominators equal.

/5

Total for this page

Ratio

To achieve the higher score, you need to:
★ solve **ratio** problems where missing values can be found by using multiplication and division facts.

1 In a fruit salad, 12 strawberries are used for every 5 peaches.

Flora uses 85 of these fruits altogether to make a large fruit salad.

How many strawberries does she use? ☐

1 (1 mark)

2 Jo draws a square with a base of 4.5 cm.

She then scales the base by a whole number to draw a larger square.

Circle the base lengths that she **cannot** make.

27 cm 45 cm 54 cm 84 cm 90 cm

2 (1 mark)

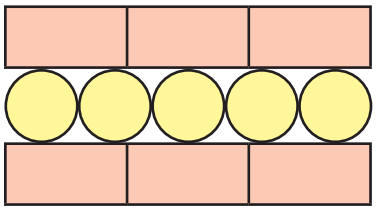
3 The ratio of fish to frogs in a small pond is 5:2

There are 14 frogs.

How many fish and frogs are there in total? ☐

3 (1 mark)

4 The picture shows one part of a repeating pattern of rectangular and circular tiles.



Complete the table using the same ratio as shown in the picture.

Rectangular tiles ▭	18		66	120	
Circular tiles ○		45			150

4 (2 marks)

Top tip

- Ratio describes how something is divided and tells you the relative sizes of the shares.

/5
Total for this page

Algebra

To achieve the higher score, you need to:
★ express missing number problems using **algebra**.

1 Henry thinks of a number and divides it by 4

He then adds 5

Circle the algebraic rule that Henry has used.

$4n + 5$ $(4 \div n) + 5$ $(n \div 4) + 5$ $\frac{n}{5} + 4$

1 (1 mark)

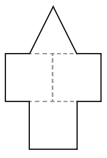
2 Use the algebraic rule $4n - 3$ to fill in the missing boxes.

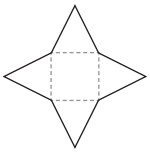
Value of n	Answer
16	☐
☐	81
4.2	☐

2 (1 mark)

3 The large shapes are made up using these smaller squares and triangles. a b

Describe each shape algebraically using a and b.





a) _____ b) _____

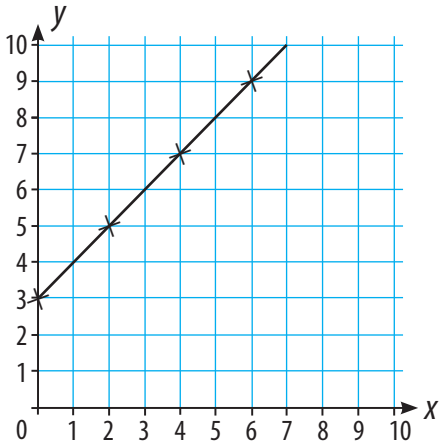
3a (1 mark)

3b (1 mark)

4 Kiki uses an algebraic rule to plot these coordinates.

Complete her rule.

$y =$ _____



4 (1 mark)

Top tip

- Remember to check your answers using the inverse operation.

/5

Total for this page

Measures

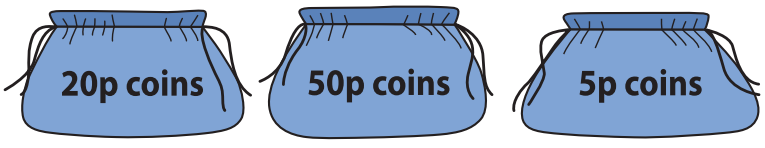
To achieve the higher score, you need to:
★ solve problems involving the calculation and conversion of units of measure, using up to three **decimal places.**

1 A 25 kg sack of flour is divided into smaller bags of 525 g.

a) How many small bags of flour can be made? ____ 1a (1 mark)

b) What is the mass of flour left in the sack? ____ kg 1b (1 mark)

2 Kate has an equal number of coins in three bags.



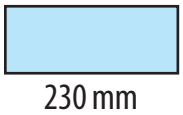
She exchanges them at the bank for **two** notes.

Circle the number of coins that could be in each bag.

10 15 20 25 40

2 (1 mark)

3 Toby uses these bricks to build a wall. A space of 0.8 cm is needed between bricks for cement.



The wall is 21 bricks long.

Calculate the actual length of the wall. ____ m

3 (2 marks)

4 A swimming pool is filled with water at a rate of 26.485 litres every 210 seconds.

Calculate the amount of water that goes into the pool in 14 minutes.

____ litres

4 (2 marks)

Top tip

- Remember to check the units of measurement each time and convert any that are not the same.

____ /7

Total for this page

Angles and degrees

To achieve the higher score, you need to:
- ★ recognise **angles** and find missing angles where they meet at a point or are on a straight line or are vertically opposite
- ★ find unknown angles in any triangle, quadrilateral or **regular polygon**.

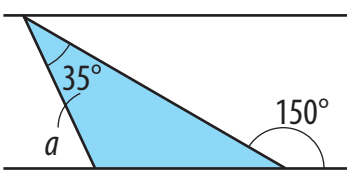
1 Five angles of an **equal** size meet at a point.

What is the size of each angle? ____ °

1 (1 mark)

2 Calculate the value of angle *a*.

a = ____ °



Not to scale

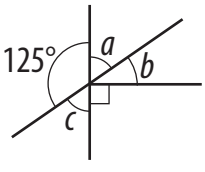
2 (1 mark)

3 Calculate angles *a*, *b* and *c*.

a = ____ °

b = ____ °

c = ____ °



Not to scale

3 (1 mark)

4 Angles in a pentagon sum to 540°.

What is the size of **each** angle in a regular pentagon? ____ °

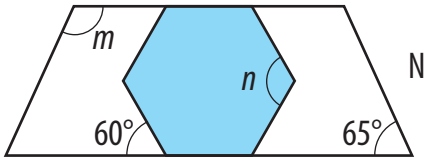
4 (2 marks)

5 A regular hexagon is drawn inside a regular trapezium.

Calculate the size of the angles *m* and *n*.

m = ____ °

n = ____ °



Not to scale

5 (2 marks)

Top tip

- Identify any angles that are of equal size.

/7

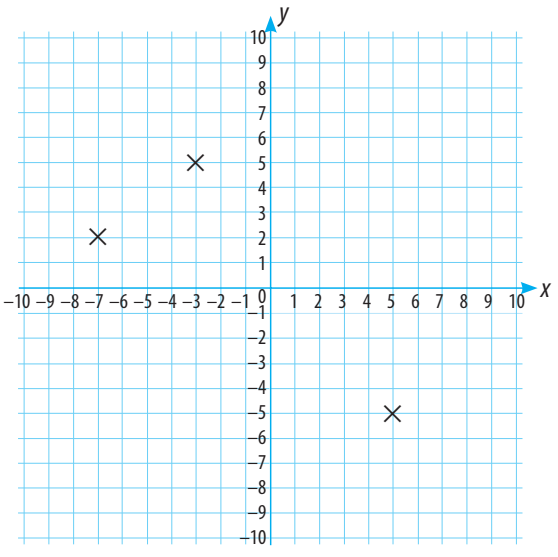
Total for this page

Coordinates

To achieve the higher score, you need to:
- ★ describe positions in all four quadrants on a 2-D coordinate grid
- ★ plot specified points and draw sides to complete a given polygon.

1 Write the coordinates of the missing vertex needed to complete the rectangle.

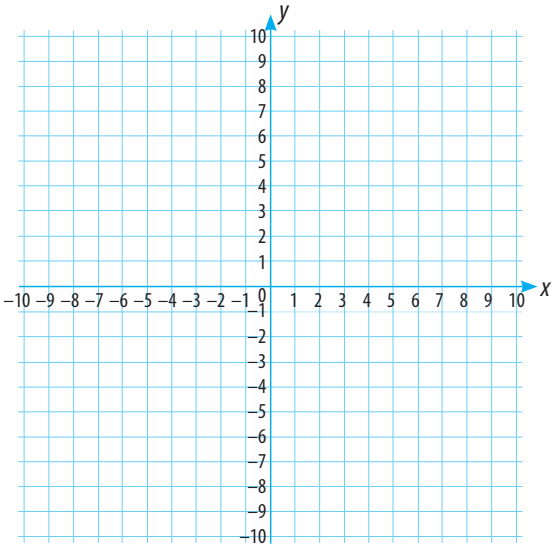
(,)



1 (1 mark)

2 a) Plot these coordinates on the grid.

(1,6) (7,1) (–5,1) (1,–9)



2a (1 mark)

b) Name the shape that has been made.

_____

2b (1 mark)

3 Ruby plots a coordinate at (0,0).

Circle any coordinates Ruby could use to plot the diagonally opposite vertex of a square. The sides of the square should be horizontal and vertical.

(1,–4) (–3,–3) (–5,4) (–4,4) (0,–6)

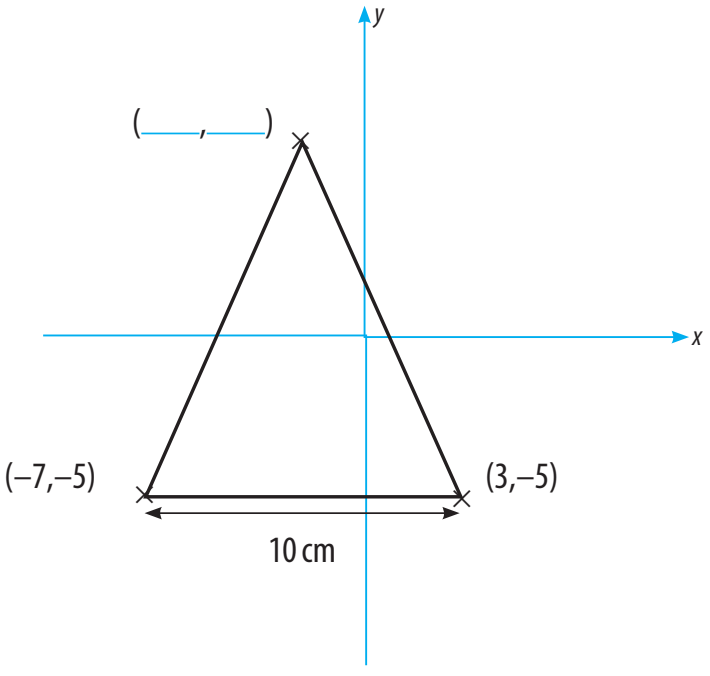
3 (1 mark)

/ 4

Total for this page

4 An isosceles triangle has a height of 11 cm.

Fill in the missing coordinates of the vertex.



4 (1 mark)

5 James plans to plot these coordinates and join them to make a square.

(5,4) (8,4) (9,0) (5,0)

Will these coordinates make a square?

Circle your answer. YES / NO

Explain your answer.

5 (1 mark)

6 (1 mark)

6 Gwen plots the 3 times table on a grid using coordinates.

Complete the pattern of coordinates:

(0,0), (1,3), (2,6), (3,9), ____, (5,15), ____, ____, ____

Top tip

- Remember that you can draw on diagrams to help you.

/3

Total for this page

Tables

To achieve the higher score, you need to:
★ complete missing data in **tables** using problem-solving skills.

1 This table shows how much money the children save.

	Sally	Ashott	Sam	Paulo
Money saved	£7.75	£10.99	£9.20	£11.49

Tick (✓) the statements that are **true**.

Sam needs to save 20% more to have the same amount as Ashott. ☐

Sally has saved just over 75% of £10 ☐

The difference between the amounts saved by two children is $\frac{5}{10}$ of a pound (£). ☐

1 (1 mark)

2 During Book Week, the children in a school compare their favourite types of books.

	Story books	Information books	Picture books	Total
Boys	$\frac{3}{8}$		25%	128
Girls		49	15%	120

a) Complete the missing information in the table.

2a (1 mark)

b) What fraction of the whole school does **not** choose story books? ☐

2b (1 mark)

3 This table shows the money a town spends on repairs each year.

	Building repairs	Parks	Road repairs
2015	£23,300		£18,273
2016	£27,308	£19,826	
2017		£23,785	£36,208
TOTAL	**£70,000**		**£83,460**

The total amount spent on parks is $\frac{4}{5}$ of the money spent on buildings.

Complete the missing information in the table.

3 (2 marks)

/5 Total for this page