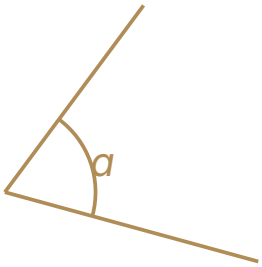
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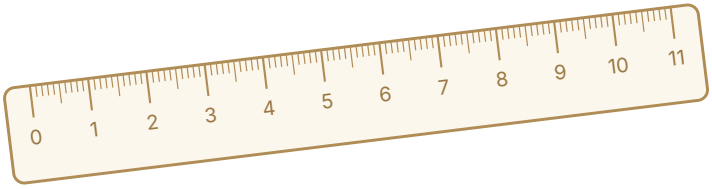
FREE SAMPLE

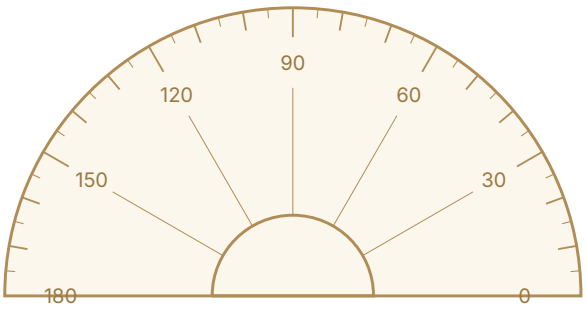
Upper KS2 Maths

Reasoning and Problem Solving

Year 5 and Year 6

Build skills. Think deeply. Solve with confidence.





REASON • EXPLORE • SOLVE • SUCCEED

How to use this workbook

This workbook is for children in Years 5 and 6 who enjoy a challenge and want to think like mathematicians. Every question is original. Each topic moves through four stages, from checking the basics to proving ideas.



A **Core**

Check essential understanding. Children who are already secure can move straight on.



B **Apply**

Use the mathematics in context. Children may need to choose their own method.



C **Think Deeper**

Unfamiliar problems, linked ideas and several steps. The working matters as much as the answer.



D **Logic Lab**

Test a claim, find a counterexample, prove a statement or investigate what is possible.

On every page

- Use the **working box** for jottings, diagrams and calculations.
- Write your final answer in the small **Answer** box in the corner.
- Tick **How confident do I feel?** at the end of each stage, and fill in the **Topic Reflection** at the end of each topic.

For parents and tutors

- Choose questions to suit the child. Not every child needs to finish every page.
- Ask "How do you know?" and "Could there be another answer?" as often as possible.
- Some Logic Lab questions have more than one valid approach. Accept any clear, correct reasoning.
- Use the answers at the back to spot misconceptions, not just to mark right or wrong.

Contents

01	Number, Place Value and Magnitude	Sample
02	Four Operations and Algebraic Thinking	Full book
03	Factors, Multiples and Patterns	Full book
04	Fractions and Fractional Reasoning	Full book
05	Decimals, Percentages and Money	Full book
06	Ratio, Proportion and Scaling	Full book
07	Measurement, Time and Rates	Full book
08	Geometry and Spatial Reasoning	Full book
09	Data, Probability and Averages	Full book
10	Mixed Challenge and Mathematical Investigation	Full book
	Visual Challenges	1 in sample
	My Progress	Full book
	Answers	Sample



1

TOPIC 01

Number, Place Value and Magnitude

Key Ideas

- Read, write and compare numbers up to ten million.
- Round numbers to any power of ten and estimate sensibly.
- Use sum and difference to find unknown numbers.

A Core

1. Write 6,040,305 in words. What is the value of the digit 4?

Show your working

Answer

2. Put these in descending order (largest first): 6.07 million, 6,700,000, 6,007,000, 6.077 million.

Show your working

Answer

How confident do I feel? ◯ Not yet ◯ Getting there ◯ Confident

TOPIC 01 | NUMBER, PLACE VALUE AND MAGNITUDE

B Apply



3. A town has 1,875,490 residents. The population rises by 125,650, then falls by 39,875. Calculate the final population exactly, then round it to the nearest 100,000.

Show your working

Answer

4. Using each of the digits 0, 2, 4, 6 and 8 exactly once, make the largest five-digit number that rounds to 60,000 to the nearest 10,000.

Show your working

Answer

How confident do I feel? ◯ Not yet ◯ Getting there ◯ Confident

TOPIC 01 | NUMBER, PLACE VALUE AND MAGNITUDE

C Think Deeper



5. Two whole numbers differ by 6,999,999. Their sum is 20,000,001. Find both numbers without trial and error.

Show your working

Answer

6. A counter shows 9,998,750. It increases by 375 each second. After how many seconds will it first go above ten million?

Show your working

Answer

How confident do I feel? ◯ Not yet ◯ Getting there ◯ Confident

D Logic Lab

7. Is it possible for a whole number to round to 7,500,000 to the nearest million? Prove your answer.

Explain or prove

Answer

8. Shannika says, "If a whole number rounds to 8 million to the nearest million, it must contain the digit 8." Is she correct? Give a counterexample.

Explain or prove

Answer

How confident do I feel? ◯ Not yet ◯ Getting there ◯ Confident

Topic Reflection

Look back over the whole topic before you move on.

Something I now understand:

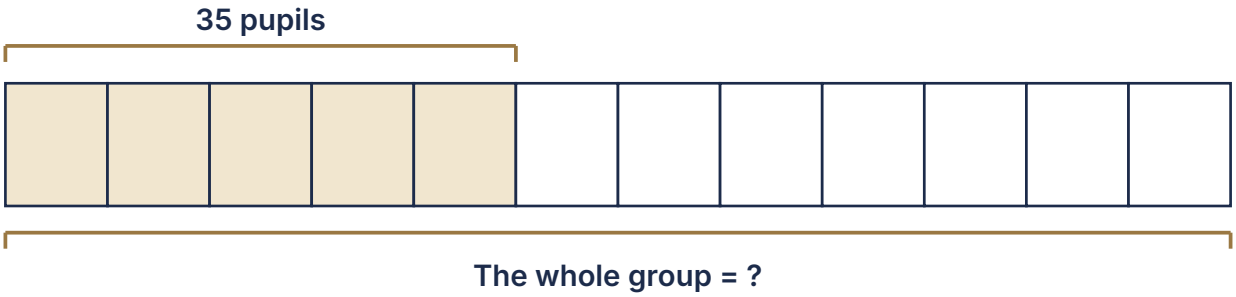
Something I want to practise again:



VISUAL CHALLENGE

Bar Model Investigation

Five of the twelve equal parts represent 35 pupils. How many pupils are in the whole group? Rebecca says the answer cannot be a whole number. Is she correct? Prove it.



Explain your reasoning

Answer

How confident do I feel? ◯ Not yet ◯ Getting there ◯ Confident

Answers

Full solutions for parents and tutors. Accept any correct method with clear reasoning.

Topic 01 | Number, Place Value and Magnitude

1	Core	Six million, forty thousand, three hundred and five. The 4 is worth 40,000.
2	Core	6,700,000, then 6.077 million (6,077,000), then 6.07 million (6,070,000), then 6,007,000.
3	Apply	1,961,265, which rounds to 2,000,000. 1,875,490 + 125,650 = 2,001,140, then 2,001,140 - 39,875 = 1,961,265.
4	Apply	64,820. The number must be between 55,000 and 64,999, so it starts with 6, the next digit can be at most 4, then 8, 2, 0.
5	Think Deeper	13,500,000 and 6,500,001. Larger = (sum + difference) / 2 and smaller = (sum - difference) / 2.
6	Think Deeper	4 seconds. After 3 seconds it shows 9,999,875; after 4 seconds it shows 10,000,250.
7	Logic Lab	Impossible. Rounding to the nearest million always gives a multiple of 1,000,000, and 7,500,000 is not one.
8	Logic Lab	No. 7,600,000 rounds to 8,000,000 but contains no 8.

Visual Challenges

Bar Model Investigation	35 / 5 = 7 pupils per part, so 12 parts = 84 pupils. Rebecca is incorrect.

END OF THE SAMPLE

WANT THE FULL BOOK?

Upper KS2 Maths Reasoning Years 5 to 6

Scan here or visit shop.mweducationuk.com/b/EXTND

Enjoyed this sample?

The full Upper KS2 Maths Reasoning and Problem Solving book takes children in Years 5 and 6 from checking the basics to explaining and proving their ideas.

- **10 topics**
  Each one moves through Core, Apply, Think Deeper and Logic Lab.
- **80 original questions**
  With a working box and an answer box for every question.
- **3 visual challenges**
  Bar models, grids and charts to read, reason about and explain.
- **Confidence checks and reflections**
  Children tick how they feel after each stage and reflect after each topic.
- **My Progress tracker**
  Tick off each stage and colour a star when a topic feels secure.
- **Full answers with methods**
  Clear working so parents can see how to get there, not just the answer.

Get the full book at mweducationuk.com

Reasoning books are available for Years 1 and 2, Years 3 and 4 and Years 5 and 6



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M&W Education UK

Based in London

Upper KS2 Maths Reasoning and Problem Solving gives confident learners original, carefully staged questions that build real mathematical thinking. Ten topics, four stages in each, three visual challenges and full worked answers.

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