

Grade 8 Maths Games, Logic & Puzzles

A challenging printable pack for mathematical reasoning, strategy, deduction and creative problem-solving.

Inside this pack

6 themed worksheets with 37 challenges.

Logic, strategy games, pattern puzzles, deduction and mathematical creativity.

Answer-key pages included for teacher/self-checking use.

1. Number Logic & Code Breakers

Show your reasoning. For open-ended puzzles, more than one valid answer may exist.

1. Find the missing number: 3, 8, 18, 38, 78, _____. Explain the rule.
2. A two-digit number has digit sum 11. Reversing its digits increases the number by 27. Find the number.
3. I am a three-digit number. My hundreds digit is twice my tens digit. My ones digit is 3 less than my tens digit. My digits add to 12. What number am I?
4. Decode using A=1, B=2, ..., Z=26: 13–1–20–8–19. Then give one mathematical word with the same total letter value.
5. Four consecutive integers have a sum of 154. Find them without simply guessing.
6. A number is multiplied by 4, then 7 is added. The result is 63. What was the number? Now create a different two-step operation that also starts with your answer and ends at 63.

Answer Key — 1. Number Logic & Code Breakers

1. 158 ($\times 2 + 2$ each time).
2. 47.
3. 363.
4. MATHS; example word: MATHS has value 65.
5. 37, 38, 39, 40.
6. 14; e.g. $\times 3 + 21 = 63$ is another two-step operation.

Teacher note: Accept alternative correct reasoning where the puzzle permits multiple solutions.

2. Sudoku, Kakuro & Grid Challenges

Show your reasoning. For open-ended puzzles, more than one valid answer may exist.

1. Complete the 4×4 Sudoku. Each row, column and 2×2 box must contain 1, 2, 3, 4 exactly once.
2. Mini Kakuro: Two cells in a row must total 11. Digits cannot repeat. List all possible pairs.
3. A 3×3 magic square uses 1–9 once each. Every row, column and diagonal must have the same sum. What is the magic sum?
4. Place the digits 1–6 in six boxes so that adjacent boxes never contain consecutive numbers. Give one valid arrangement.
5. A 3×3 grid contains numbers 1–9. Can you arrange them so each row has an odd sum? Explain your reasoning.
6. Challenge: Create a 4×4 Latin square using 1–4 so every row and column contains each number exactly once.

Answer Key — 2. Sudoku, Kakuro & Grid Challenges

1. Any valid 4×4 Sudoku completion using 1–4 once per row/column/box.
2. (2,9), (3,8), (4,7), (5,6).
3. 15.
4. Example: 1,3,5,2,4,6.
5. Yes; for example use three odd numbers in each row, while arranging the even numbers appropriately; many solutions exist.
6. Example cyclic Latin square: 1 2 3 4 / 2 3 4 1 / 3 4 1 2 / 4 1 2 3.

Teacher note: Accept alternative correct reasoning where the puzzle permits multiple solutions.

3. Strategy Games & Winning Moves

Show your reasoning. For open-ended puzzles, more than one valid answer may exist.

1. A pile has 21 counters. Players remove 1, 2 or 3 counters per turn. The player taking the last counter wins. What number of counters should you leave after your turn to force a win?
2. Two players alternately add 1–5 to a running total starting at 0. The player who reaches exactly 50 wins. Describe a winning strategy.
3. In a 5×5 dots-and-boxes board, why is it useful to think about chains of three-sided boxes? Explain the strategic idea.
4. A game starts with 30 points. On each turn you may divide by 2 if even, or subtract 3 if odd. Can you reach 1? Show a sequence or explain why not.
5. You have coins worth 1, 3 and 7 points. Find a way to make 20 using exactly 5 coins.
6. Design a fair two-player maths game using a standard deck of cards. State the rules and explain why luck alone does not determine the winner.

Answer Key — 3. Strategy Games & Winning Moves

1. Leave 17 (then respond to the opponent's 1–3 with 3–1 to return to multiples of 4).
2. Aim to make your move total 5,10,15,...,50; if the opponent adds x , add $5-x$.
3. Chains let a player control when several boxes become available, often creating a forced sequence of captures.
4. $30 \rightarrow 15 \rightarrow 12 \rightarrow 6 \rightarrow 3 \rightarrow 0$, so 1 cannot be reached by this route; from 30 the process reaches 0.
5. One solution: $7+7+3+1+2 = 20$.
6. Example: draw two cards; score the absolute difference, then answer a short maths question to double the score. Explain the design so strategy/knowledge matters.

Teacher note: Accept alternative correct reasoning where the puzzle permits multiple solutions.

4. Visual & Pattern Puzzles

Show your reasoning. For open-ended puzzles, more than one valid answer may exist.

1. Continue the pattern: 2, 6, 12, 20, 30, 42, _____. Find the n th-term rule.
2. A matchstick pattern uses 4 sticks for 1 square, 7 for 2 joined squares, 10 for 3 joined squares. How many for 25 squares? Explain.
3. A staircase has 1 block in row 1, 3 in row 2, 6 in row 3, 10 in row 4. How many blocks are needed for 10 rows?
4. Find the next two terms: 1, 4, 10, 22, 46, ___, ___. Describe the rule.
5. A rectangle is divided into 4 equal smaller rectangles. If one small rectangle has perimeter 18 cm and dimensions are whole numbers, give two possible dimensions and discuss which arrangement could form the larger rectangle.
6. Draw a figure with exactly one line of symmetry and rotational symmetry of order 2. Name your figure.

Answer Key — 4. Visual & Pattern Puzzles

1. 56; rule $n(n+1)$.
2. $3n+1$, so 76 sticks.
3. 55 blocks (triangular number $10 \times 11 / 2$).
4. 94, 190; $\times 2 + 2$ each time.
5. Whole-number factor pairs of 18: 1×17 or 2×9 or 3×6 ; discuss which dimensions can be paired/arranged to form the required larger rectangle.
6. Example: a rectangle that is not a square has one pair of symmetry axes and rotational symmetry of order 2.

Teacher note: Accept alternative correct reasoning where the puzzle permits multiple solutions.

5. Maths Detective & Deduction

Show your reasoning. For open-ended puzzles, more than one valid answer may exist.

1. Three friends—Asha, Ben and Cara—each chose a different number: 12, 18, 24. Asha did not choose 12. Ben's number is greater than Asha's. Who chose which number?
2. A box contains red, blue and green counters. There are 18 counters. Red is twice blue; green is 3 more than blue. Find all quantities.
3. Four students scored 68, 74, 81 and 87. Mira scored more than 74 but less than 87. Sam scored less than Mira. Give all possible scores for Mira and explain.
4. A secret number is between 1 and 100. It is divisible by 6, not divisible by 9, and its digit sum is 9. Find the number.
5. A shopkeeper gives one of four discounts: 5%, 10%, 15% or 20% to four customers. Each gets a different discount. Use clues to assign them: Ravi did not get 5% or 20%; Neha got more than Ravi; Omar got 20%; Priya got less than Neha.
6. Challenge: Write your own five-clue logic puzzle with one unique solution. Include the answer.

Answer Key — 5. Maths Detective & Deduction

1. Asha=18, Ben=24, Cara=12.

2. Blue=3, red=6, green=6.

3. Mira=81; Sam=68 or 74.

4. 54.

5. Omar=20%; Ravi=10% or 15% with the remaining clues resolved; the clues as written permit more than one assignment, so students should identify that ambiguity.

6. Answers will vary; unique solution required.

Teacher note: Accept alternative correct reasoning where the puzzle permits multiple solutions.

6. Ultimate Maths Puzzle Challenge

Show your reasoning. For open-ended puzzles, more than one valid answer may exist.

1. Find a three-digit number whose digits multiply to 24 and whose digit sum is 10. Give all possibilities.
2. A farmer has chickens and rabbits. There are 18 animals and 50 legs. How many of each are there? Solve algebraically or logically.
3. Using exactly four 4s and any operations, make 20. Give two different solutions.
4. A number leaves remainder 2 when divided by 5, remainder 3 when divided by 7, and is less than 100. Find all such numbers.
5. You have 8 identical-looking balls; one is heavier. Using a balance scale only twice, explain how to guarantee finding it.
6. A 5×5 grid is filled with positive integers. Every row sums to 25. Must the total of the grid be 125? Explain using a general argument.
7. Create a four-step 'maths mystery' in which each answer gives a clue to the next step. Include a final answer.

Answer Key — 6. Ultimate Maths Puzzle Challenge

1. 236, 263, 326, 362, 623, 632.

2. Chickens=11, rabbits=7.

3. Examples: $4 \times 4 + 4 - 4 = 16$ (not 20), so a valid pair must be used; one solution is $(4 - 4/4) \times 4 = 12$, so challenge is to find valid 20 solutions such as $4! - 4 = 20$ if factorial is allowed, or $4 \times 4 + 4 - 4 = 16$ is invalid. Students should state allowed operations.

4. 17, 52, 87.

5. Split into 3,3,2; weigh 3 vs 3. If balanced, weigh the 2 against each other; if not, weigh two from the heavier group.

6. Yes. Adding the five row sums gives the total: $5 \times 25 = 125$.

7. Answers vary; must have four linked steps and a unique final answer.

Teacher note: Accept alternative correct reasoning where the puzzle permits multiple solutions.