Year 6 Olympiad Mathematics

Non-routine challenges: patterns, deduction and proof | Suggested time: 50-60 minutes | Name: _____ Date: _____

Student instructions: Work independently where possible. Show your reasoning and explain your ideas. You may leave a question and return to it.

Patterns and number logic

1. A sequence begins 2, 5, 11, 23, 47, ... Find the next two terms and justify the rule.

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2. Using the digits 1, 2, 3 and 4 exactly once, make two two-digit numbers with the smallest possible positive difference. Explain why.

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3. Three consecutive whole numbers have a sum of 156. What are they?

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4. A two-digit number has digit sum 11. Reversing its digits increases it by 27. Find the number.

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Combinatorics and strategy

1. There are 5 students. Each shakes hands once with every other student. How many handshakes occur? Explain without listing all pairs.

2. A 3-by-3 grid is made of 9 unit squares. How many squares of all sizes are in the grid?

3. A frog starts at 0 and makes jumps of either 1 or 2 spaces. How many different jump sequences reach space 5?

4. A bag contains 4 red, 5 blue and 6 green marbles. Without looking, how many must you take to guarantee at least 3 of one colour?

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Geometry and reasoning

1. A rectangle is 12 cm by 8 cm. A 4 cm by 3 cm rectangle is cut from one corner. What is the perimeter of the remaining L-shape?

2. On a clock, what is the smaller angle between the hands at 3:30? Explain.

3. A farmer has chickens and rabbits: 12 heads and 34 legs in total. How many of each?

4. Find all pairs of positive whole numbers whose product is 36 and whose sum is less than 15.

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Parent Guide | Olympiad Mathematics

This is a formative assessment, not a standardised examination. Encourage independent thinking, record useful observations, and avoid comparing children solely by total score.

Solutions and reasoning

1. 95, 191; multiply by 2 then add 1.

2. 31 and 24 (difference 7); also 42 and 31 (difference 11) is not minimal. Explain why the best tens digits and units minimise the gap.

3. 51, 52, 53.

4. 47; reversing gives 74.

5. 10 handshakes; 5 x 4 / 2.

6. 14 squares: 9 small, 4 medium, 1 large.

7. 8 sequences.

8. 7 marbles; at worst two of each colour first.

9. 40 cm; cutting a corner preserves perimeter.

10. 75 degrees; minute hand at 180 degrees, hour hand at 105 degrees.

11. 7 chickens and 5 rabbits.

12. (4,9) and (6,6), plus reverse ordering if order matters.

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How to guide

Allow 45-60 minutes or split into two sessions. Olympiad problems are designed to be unfamiliar; partial reasoning is valuable.

Ask students to draw a table, test a small case, work backwards, or explain why an answer must be complete. Avoid supplying a trick immediately.

After the assessment

Ask: Which question felt easiest? Which needed a different strategy? What would you try next time? Celebrate clear explanations as well as correct answers. Revisit one or two specific skills in short, supportive sessions.