YEAR 8 | IB MYP DIAGNOSTIC

Olympiad Mathematics | Enrichment and Reasoning

Student name: _____ Date: _____

Suggested time: 55 minutes | Unofficial MYP-aligned diagnostic | Show your thinking.

An optional enrichment diagnostic complementing MYP Mathematics. These are non-routine problems; credit systematic attempts, diagrams and convincing explanations.

Patterns and number theory

1. A sequence begins 2, 5, 10, 17, 26, ... Predict the 15th term and prove your rule.

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2. Find all two-digit numbers whose digits sum to 11 and whose number is divisible by 9. Explain your conclusion.

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3. A number leaves remainder 2 when divided by 5 and remainder 3 when divided by 7. Find the smallest positive such number and explain a systematic method.

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Counting and logical deduction

4. Four students each shake hands with every other student exactly once. How many handshakes occur? Generalise to n students.

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5. How many three-digit even numbers can be made using digits 1, 2, 3, 4, 5 without repetition? Show your counting strategy.

6. Three boxes are labelled APPLES, ORANGES and MIXED, but every label is wrong. You may take one fruit from one box. Which box should you choose to identify all three? Explain.

Geometry and proof

7. A 6 × 6 square grid is made of unit squares. How many squares of all possible sizes are in the grid? Show how you counted.

8. Two whole numbers have sum 30 and product 209. Find them without listing every possible pair, and explain.

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PARENT / TUTOR GUIDE

Keep this section separate from the student during the assessment. The purpose is to identify current understanding and next teaching steps, not to assign an official IB grade.

Worked solutions and reasoning

• 1. $n^2 + 1$; 15th term = 226. Differences are successive odd numbers.

• 2. None: a number divisible by 9 must have a digit sum divisible by 9, but 11 is not.

• 3. 17: numbers 2, 7, 12, 17, ...; 17 mod 7 = 3.

• 4. 6; $n(n - 1)/2$ because each pair is counted once.

• 5. 24: 2 choices for last digit (2 or 4), then 4 choices for hundreds and 3 for tens.

• 6. Draw from the box marked MIXED. Because it is incorrectly labelled, it must contain only one fruit; use that result and the wrong-label condition.

• 7. $1^2 + 2^2 + ... + 6^2 = 91$ squares.

• 8. 11 and 19; $(x - 11)(x - 19) = 0$, or use factors of 209.

Teaching observations

• Look for perseverance and organised casework.

• Ask students to justify completeness: “How do you know there are no other solutions?”

• Olympiad performance should not be interpreted as an official MYP achievement level.

Suggested diagnostic follow-up

Look for clarity of reasoning, correct use of subject vocabulary, the quality of evidence and whether the student can revise an answer after a probing question. Record strengths and one or two priorities for future lessons.

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