Polygonal Numbers: Build Sequences and Derive nth-Term Formulas

Original tasks 1, 2 / independent work

Task 1

A dot diagram shows triangular numbers. Term 1 is one dot. Term 2 adds a ring of 2 dots. Term 3 adds a ring of 3 dots. Term 4 adds a ring of 4 dots. Build the first five terms, compute differences, and derive the nth-term formula.

Task 2

A sequence begins 1, 6, 15, 28, 45. A dot diagram for term 3 shows a central dot, a ring of 5 dots, and a ring of 9 dots. Identify the polygon family, compute second differences, and derive the formula.

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Original tasks 3, 4 / independent work

Task 3

Square numbers have terms 1, 4, 9, 16, 25. A dot diagram for term 4 is a 4-by-4 array. Derive the nth-term formula using differences and verify for n = 6.

Task 4

A sequence has constant second difference 5 and begins 1, 7, 18, 34, 55. Identify the polygon family, derive the formula, and verify for n = 5.