

Sequences and nth terms

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Purpose

Generate and recognise sequences. Find a linear nth-term rule and use it to decide whether a value belongs.

Vocabulary

Term: number in a sequence. Position: index n , starting at 1 here. Arithmetic: constant difference. Geometric: constant multiplier. Fibonacci type: add the previous two terms.

Why the method works

For an arithmetic sequence, dn supplies the constant difference d . Compare the first term with d to find the adjustment. Thus 5,8,11,... is $3n+2$. A term-to-term rule generates the next term; an nth-term rule finds any position directly.

Method and checking

Inspect differences and ratios before choosing a pattern. For linear sequences write $dn+c$, use $n=1$ to find c and test more terms. To test membership, solve for n and require a positive integer.

Common errors and next attempt

If the first term is used as the coefficient, compare several differences. If n starts at zero, restate the position convention. If a quadratic pattern is treated as linear, compare differences. Recheck 4,7,10 as $3n+1$.