

Arithmetic and Geometric Sequences - Recursive Formulas

When you want to find the *next* term in an arithmetic or geometric sequence...

Use a _____.

NOW-NEXT Formula! You have a number now, what's the next number?

Determine the next terms in the given arithmetic sequence using the recursive formula.

$$a_n = a_{n-1} + d$$

Example:

Determine the next 3 terms in the sequence 30, 70, 110, ...

Find the common difference:

$$d = \text{common difference} = 2^{\text{nd}} \text{ term} - 1^{\text{st}} \text{ term} = 70 - 30 = 40$$

Use the recursive formula to solve:

Given the first 3 terms, find the 4th, 5th, and 6th terms.

$$a_4 = 110 + 40 = 150$$

$$a_5 = 150 + 40 = 190$$

$$a_6 = 190 + 40 = 230$$

- Determine the next 2 terms in the sequence 16, 30, 44, 58, ...
- Determine the next 3 terms in the sequence -68, -83, -98, ...
- Determine the next 4 terms in the sequence 7.3, 9.4, 11.5, ...
- Determine the next 2 terms in the sequence $\frac{1}{2}$, 1, $\frac{3}{2}$, 2, ...

Determine the next terms in the given geometric sequence using the recursive formula.

$$g_n = g_{n-1} \cdot r$$

Example:

Determine the next 3 terms in the sequence 100, -50, 25, ...

Find the common ratio:

$$r = \text{common ratio} = \frac{\text{2nd term}}{\text{1st term}} = \frac{-50}{100} = -0.5$$

Use the recursive formula to solve:

Given the first 3 terms, find the 4th, 5th, and 6th terms.

$$g_4 = 25 \cdot (-0.5) = -12.5$$

$$g_5 = -12.5 \cdot (-0.5) = 6.25$$

$$g_6 = 6.25 \cdot (-0.5) = -3.125$$

5. Determine the next 2 terms in the sequence 4, 8, 16, 32, ...
6. Determine the next 3 terms in the sequence -5, 20, -80, ...
7. Determine the next 4 terms in the sequence 2, -6, 18, ...
8. Determine the next 2 terms in the sequence 3, 1.5, 0.75, ...