Name: _____   Date: _____   Period: _____

Explicit Formula
Used to find specific "place in line"

Arithmetic	Geometric
$a_n = a_1 + d(n - 1)$	$a_n = (a_1)(r)^{n-1}$
a_1 is the initial value d is the **common difference** (the amount **added** to advance from one term to the next)	a_1 is the initial value r is the **common ratio** (the amount by which each term is **multiplied** to advance to the next term)

Example:
Write the explicit formula for the following sequence:
9, 16, 23, 30

Initial Value	Common Difference	Equation*
9 ⟹	**+7** ⟹	$a_n = 9 + 7(n - 1)$

*Simplify the equation into y = mx + b format:

$a_n = 9 + 7n - 7$ ⟹ $a_n = 7n + 2$

Example:
Write the explicit formula for the following sequence:
-1, 3, -9, 27

Initial Value	Common Ratio	Equation
-1 ⟹	**-3** ⟹	$a_n = (-1)(-3)^{n-1}$

Practice Problems:

1. Write the equation for the arithmetic sequence using sequence notation.
    11, 16, 21, 26, 31, …

Initial Value	Common Difference	Equation*

Simplify: _____ ⟹ _____

2. Write the equation for the geometric sequence using sequence notation.
    5, 15, 45, 135, 405, …

Initial Value	Common Ratio	Equation

3. Write the equation for the arithmetic sequence using sequence notation.
    -29, -34, -39, -44, -49

Initial Value	Common Difference	Equation*

Simplify: _____ ⟹ _____

4. Write the equation for the geometric sequence using sequence notation.
    -4, 8, -16, 32, -64

Initial Value	Common Ratio	Equation

5. Write the equation for the arithmetic sequence using sequence notation.
    -34, -26, -18, -10, -2

Initial Value	Common Difference	Equation*

Simplify: _____ ⟹ _____

6. Write the equation for the geometric sequence using sequence notation.
    5, 25, 125, 625, …

Initial Value	Common Ratio	Equation

A sequence can also be described with a **recursive formula** that gives the initial term and the relationship between consecutive terms.

Recursive Formula
Uses previous term to find next term

Arithmetic	Geometric
a_1 = first term $a_n = a_{n-1} + d$	a_1 = first term $a_n = (a_{n-1})(r)$

Arithmetic		Geometric	
a_1 must be given a_{n-1} = previous term	d is the **common difference** (the amount **added** to advance from one term to the next)	a_1 must be given a_{n-1} = previous term	r is the **common ratio** (the amount by which each term is **multiplied** to advance to the next term)

Example:
Write the recursive formula for the following sequence:
9, 16, 23, 30

Example:
Write the recursive formula for the following sequence:
-1, 3, -9, 27

Initial Value	Common Difference	Equation*	Initial Value	Common Ratio	Equation*
9	+7	$a_1 = 9$ $a_n = a_{n-1} + 7$	-1	-3	$a_1 = -1$ $a_n = (a_{n-1})(-3)$

* When writing the equation for a recursive formula, you MUST include a_1 as part of the equation

Practice Problems:
1. Write the recursive formula for the following sequence:
-17, -11, -5, 1

2. Write the recursive formula for the following sequence:
-4, 12, -36, 108

Initial Value	Common Difference	Equation*	Initial Value	Common Ratio	Equation

3. Write the recursive formula for the following sequence:
-1, 9, 19, 29

4. Write the recursive formula for the following sequence:
4, -20, 100, -500

Initial Value	Common Difference	Equation*	Initial Value	Common Ratio	Equation

5. Write the recursive formula for the following sequence:
9, 11, 13, 15

6. Write the recursive formula for the following sequence:
3, 6, 12, 24, 48

Initial Value	Common Difference	Equation*	Initial Value	Common Ratio	Equation

A Sequence