11.1 Mathematical Patterns **Name**_____
Algebra 2B **Date**_____**Per**_____

Arithmetic: the **difference** between consecutive terms is constant (common difference ***d***).
Geometrc: the **ratio** between consecutive terms is constant (common ratio **r**).

Recursive Formula: defines the terms in a sequence by relating each term to the term before it.
For example: **Arithmetic:** $a_n = a_{n-1} + d$ **Geometric:** $a_n = a_{n-1} \bullet r$
→To find a specific term given the recursive formula, you must be given the previous term.

Explicit Formula: defines the ***nth*** term in terms of ***n***.
For example: **Arithmetic:** $a_n = a_1 + (n-1)d$ **Geometric:** $a_n = a_1 \bullet r^{n-1}$

Ex. #1 Find the first 5 term of the sequence (recursive):

a) $a_n = a_{n-1} - 6; a_1 = 12$

b) $a_n = \frac{1}{3} a_{n-1}; a_1 = 12$

Ex. #2 Find the first 5 terms of the sequence (explicit):

a) $a_n = 3n - 1$

b) $a_n = n(n-1)$

Ex. #3 Describe the following sequences as arithmetic, geometric, or neither. Then, write the recursive and explicit formula for each:

a) $4, 8, 12, 16, \ldots$

b) $16, 8, 4, 2 \ldots$

c) $4, 9, 16, 25, \ldots$

d) $-1, 1, -1, 1, \ldots$