Name: _____ Date: _____

Sequences: Lesson 3 – Practice with Arithmetic and Geometric Sequences Algebra 1 CC

"I can differentiate between arithmetic and geometric sequences to write equations and find missing terms."

Warm Up: fill in the blanks-

When given a sequence, if we add/subtract to get to the next term, called the common difference

A it's referred to as an arithmetic sequence. The graph is linear.

The explicit formula used is $a_n = a_1 + d(n-1)$.

When given a sequence, if we multiply by a whole number or fraction, called the common ratio,

G it's referred to as a geometric sequence. The graph is exponential.

The explicit formula used is $a_n = a_1 (r)^{n-1}$.

Guided Practice:

A

Arithmetic Sequence	$a_n = a_1 + (n-1)d$ ←
Geometric Sequence	$a_n = a_1 (r)^{n-1}$

You are given the two equations to the left on your **REFERENCE SHEET.**

Arithmetic: Linear - common difference *

Geometric: Exponential - common ratio *

Exercise 1 - Determine whether each sequence is arithmetic or geometric. State the common difference or common ratio. State if the graph would be linear or exponential.

Sequence	Arithmetic or Geometric	Common difference or Common ratio	Linear or Exponential
a) 15, 13, 11, 9, … (-2, -2, -2)	Arithmetic	$d = -2$	Linear
b) 1, 4, 16, 64, …			
c) 2, -4, 8, -16, … (×-2, ×-2, ×-2)	Geometric	$r = -2$	Exponential

Exercise 2- Determine if the following sequence is arithmetic or geometric: 50, 10, 2, …

a) Write an *explicit* formula. $a_n = 50\left(\frac{1}{5}\right)^{n-1}$ (×$\frac{1}{5}$)

b) Find the 5th term

* Remember: $r = \frac{a_2}{a_1}$

Exercise 3- Determine if the following sequence is arithmetic or geometric: 35, 32, 29, 26, …

a) Write an *explicit* formula.

b) Find the 25th term

Regents Questions: Show all work leading to your answer.

1. The third term in an arithmetic sequence is 10 and the fifth term is 26. If the first term is a_1, which is an equation for the nth term of this sequence?

(1) $a_n = 8n + 10$

(2) $a_n = 8n - 14$

(3) $a_n = 16n + 10$

(4) $a_n = 16n - 38$

2. Which formula can be used to find the nth term in the geometric sequence 96, 72, 54, ... ?

(1) $a_n = 96(\frac{4}{3})^{n-1}$ ← growing → increasing

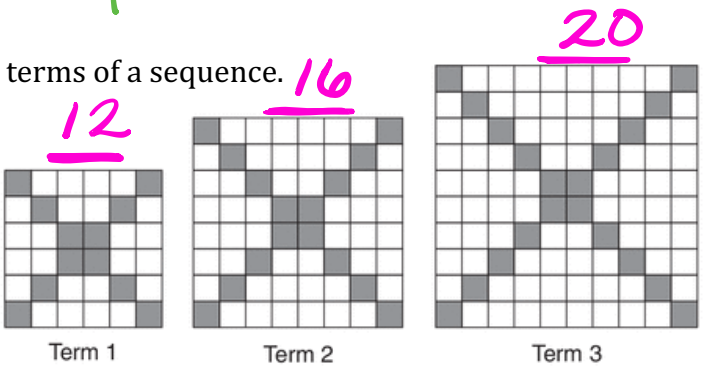
(2) $a_n = 96(\frac{3}{4})^{n-1}$

(3) $a_n = 96(\frac{4}{3})^{n}$

(4) $a_n = 96(\frac{3}{4})^{n}$

$a_n = a_1(r)^{n-1}$

3. The diagram below represents the first three terms of a sequence.



$a_n = a_1 + d(n-1)$

$a_n = 12 + 4(n-1)$

Assuming the pattern continues, which formula determines a_n, the number of shaded squares in the n^{th} term?

(1) $a_n = 4n + 12$

(2) $a_n = 4n + 8$

(3) $a_n = 4n + 4$

(4) $a_n = 4n + 2$

$12 + 4(n-1)$

$12 + 4n - 4$

$a_n = 4n + 8$

4. A theater has 35 seats in the first row. Each row has four more seats than the row before it. Which expression represents the number of seats in the nth row?

(1) $35 + (n + 4)$

(2) $35 + (4n)$

(3) $35 + (n + 1)(4)$

(4) $35 + (n - 1)(4)$

5. Answer the following questions given the explicit formula $a_n = 2(\frac{1}{4})^{n-1}$ when $n \geq 1$

a) Find a_1, a_2, a_3, a_4

b) State whether the sequence is arithmetic or geometric. Justify your answer.