Name: _____ Class: _____

Linear and Exponential Functions Day Two: Sequences

Question 1

An **arithmetic sequence** is defined by the following list of numbers, where $a(1) = -16$.

$$-16, -33, -50$$

(a) Find the value of $a(7)$

(b) Create an explicit definition for this arithmetic sequence

Question 2

Helmut created a geometric sequence defined by the recursive formula $a(3) = 256$ and $a(n) = a(n-1) \cdot \frac{1}{2}$

(a) State the first five terms in this sequence.

(b) Create an explicit definition for this geometric sequence.

Question 3

Consider the sequence defined by the recursive formula $a_1 = -3$ and $a_n = 2a_{n-1} + 1$. Find the value of a_5.

Question 4 (Linear Function Review)
The table below relates x and y:

x	0	1	2	3	4
y	3	5	7	9	11

Choose the statement that best represents the table:

(a) y is three more than x (b) y is three more than twice of x (c) y is four more than x (d) y is x

Question 5
An arithmetic sequence is given using the recursive definition: $A_1 = -3$ and $A_n = A_{n-1} + 6$. Create an explicit function, a_n, for the *n*th term in the sequence. Show all work, *algebraically*.

Question 6
Consider an arithmetic sequence where Term 2 is 14 and Term 4 is 34. Find an explicit formula for this sequence. Show all work, *algebraically*.

Question 7
For the sequence $-27, -12, 3, 18, \ldots$, the expression that defines the nth term where $a_1 = -27$ is

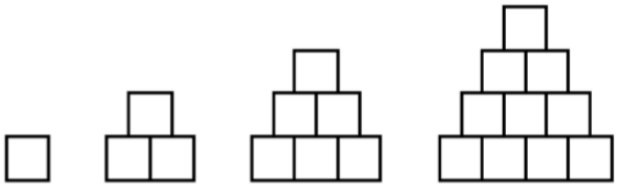
(1) $15 - 27n$ (3) $-27 + 15n$

(2) $15 - 27(n - 1)$ (4) $-27 + 15(n - 1)$

Questions 8-11

8.

A sequence of blocks is shown in the diagram below.



This sequence can be defined by the recursive function $a_1 = 1$ and $a_n = a_{n-1} + n$. Assuming the pattern continues, how many blocks will there be when $n = 7$?

1) 13
2) 21
3) 28
4) 36

9.

The first four terms of the sequence with $a_1 = 40$ and $a_n = \frac{3}{4} a_{n-1}$ are

1) $30, 22, 17, 13$
2) $40, 30, 22\frac{1}{2}, 16\frac{7}{8}$
3) $40, 30, 22, 17$
4) $30, 22\frac{1}{2}, 16\frac{7}{8}, 12\frac{21}{33}$

10.

When a ball bounces, the heights of consecutive bounces form a geometric sequence. The height of the first bounce is 121 centimeters and the height of the third bounce is 64 centimeters. To the *nearest centimeter*, what is the height of the fifth bounce?

1) 25
2) 34
3) 36
4) 42

11.

Given the function $f(n)$ defined by the following:

$$f(1) = 2$$

$$f(n) = -5f(n-1) + 2$$

Which set could represent the range of the function?

1) $\{2, 4, 6, 8, \ldots\}$
2) $\{2, -8, 42, -208, \ldots\}$
3) $\{-8, -42, -208, 1042, \ldots\}$
4) $\{-10, 50, -250, 1250, \ldots\}$

Question 12

The recursive formula to describe a sequence is shown below.

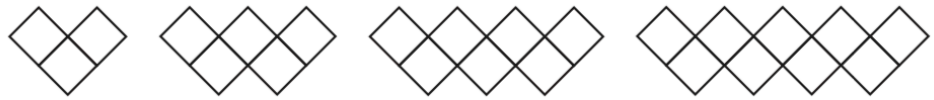
$$a_1 = 3$$

$$a_n = 1 + 2a_{n-1}$$

State the first four terms of this sequence. Can this sequence be represented using an explicit geometric formula? Justify your answer.

Question 13

If the pattern below continues, which equation(s) is a recursive formula that represents the number of squares in this sequence?



Design 1 Design 2 Design 3 Design 4

(1) $y = 2x + 1$

(2) $y = 2x + 3$

(3) $a_1 = 3$
$a_n = a_{n-1} + 2$

(4) $a_1 = 1$
$a_n = a_{n-1} + 2$

Question 14

On the main floor of the Kodak Hall at the Eastman Theater, the number of seats per row increases at a constant rate. Steven counts 31 seats in row 3 and 37 seats in row 6. How many seats are there in row 20?

(1) 65

(2) 67

(3) 69

(4) 71

Question 15

If $a_n = n(a_{n-1})$ and $a_1 = 1$, what is the value of a_5?

(1) 5

(2) 20

(3) 120

(4) 720

Question 16 (Literal Equations Review)

Students were asked to write a formula for the length of a rectangle by using the formula for its perimeter, $p = 2\ell + 2w$. Three of their responses are shown below.

I. $\ell = \frac{1}{2}p - w$

II. $\ell = \frac{1}{2}(p - 2w)$

III. $\ell = \frac{p - 2w}{2}$

Which responses are correct?

(1) I and II, only

(2) II and III, only

(3) I and III, only

(4) I, II, and III