Algebra 1R
Unit 5 ~ Day 1 Notes

Name _____

CHAPTER 4: SEQUENCES

Section 4.1: Recognizing patterns and sequences

A **sequence** is a pattern involving an ordered arrangement of numbers, geometric figures, letters, or other objects.

Warm-Up

Write the next three terms in each pattern and explain how you generated each term. (Hint: when letters are used, think about what each letter could represent.)

a) J, F, M, A, M, J, J, A, S, ... O, N, D

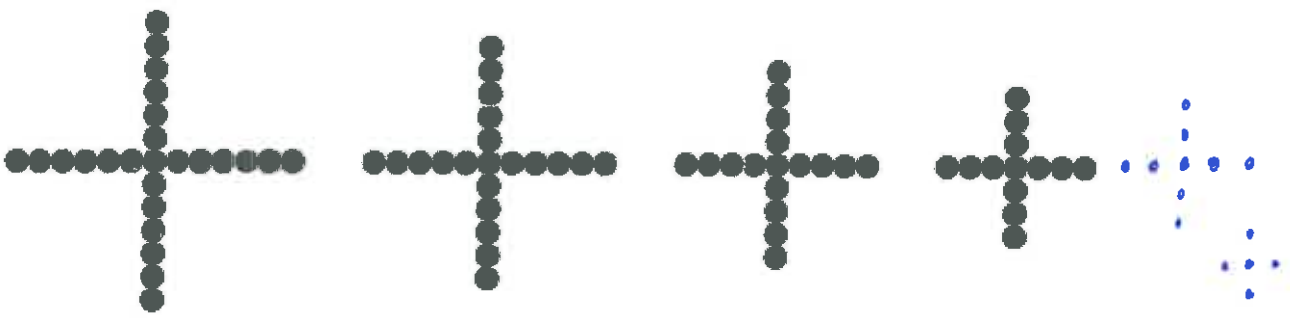
b) S, M, T, W, ... T, F, S

c) 5, 10, 15, 20, ... 25, 30, 35

d) 100, 81, 64, 49, ... 36, 25, 16

Examples: Describe the pattern, draw or describe the next terms, and represent each sequence numerically.

1. "Positive Thinking"



each figure has 4 less dots than the one before it.

25, 21, 17, 13, 9, 5, 1

2. "Al's Omelets"

Al's House of Eggs makes omelets. Al begins each day with 150 eggs to make his famous *Bestern Western Omelets*. After making 1 omelet he has 144 eggs left. After making 2 omelets he has 138 eggs left. After making 3 omelets he has 132 eggs left.

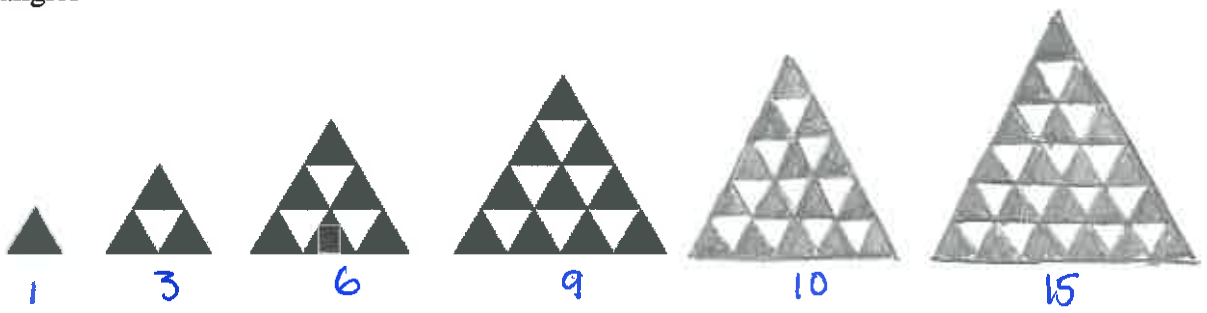
Al has 6 fewer eggs after making each omlet.

After 4 omlets, Al has 126 eggs

After 5 omlets, Al has 120 eggs

150, 144, 138, 132, 126, 120, ...

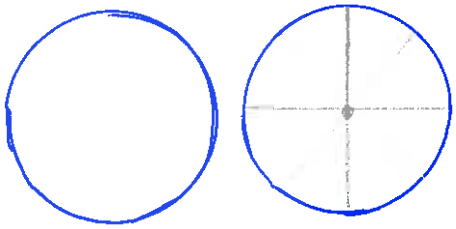
3. "Troop of Triangles"



4. "Pizza Contest"

Jacob is participating in a pizza making contest. Each contestant not only has to bake a delicious pizza, but they have to make the largest pizza they can. Jacob's pizza has a 6-foot diameter! After the contest, he plans to cut the pizza so that he can pass the slices out to share. He begins with 1 whole pizza. Then, he cuts it in half. After that, he cuts each of those slices in half. Then he cuts each of those slices in half, and so on.

1, 2, 4, 8, 16,



Check for Understanding:

Write the next two terms of each sequence and explain how you generated each term.

a) 4, 10, 16, 22, ... 28, 34

6 6 6

b) -7, -10, -13, -16, ... -19, -22

-3 -3 -3

**If a sequence continues on forever, it is called an infinite sequence.

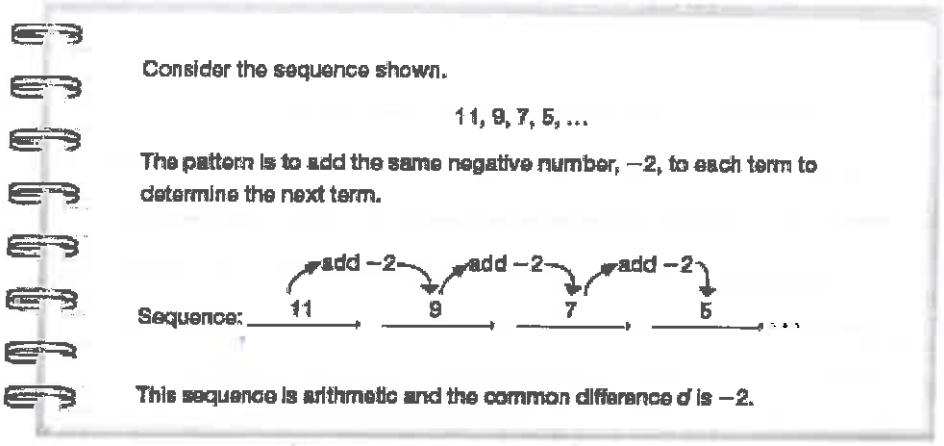
**If a sequence terminates, it is called a finite sequence.

For example, consider an auditorium where the seats are arranged according to a specific pattern. There are 22 seats in the first row, 26 seats in the second row, 30 seats in the third row, and so on. Does it make sense for this sequence to continue without end?

No, the auditorium only has so much space/seats

Section 4.2: Arithmetic and Geometric Sequences

Arithmetic Sequence is a sequence of numbers in which the difference between any two consecutive terms is a constant. There is a "common difference." The same number is added to both terms.



Consider the sequence shown.

11, 9, 7, 5, ...

The pattern is to add the same negative number, −2, to each term to determine the next term.

Sequence: 11 —(add −2)→ 9 —(add −2)→ 7 —(add −2)→ 5 → ...

This sequence is arithmetic and the common difference d is −2.

Examples: Find the "d" value.

1) 2, 5, 8, 11, 14

$d = 3$

2) 33, 28, 23, 18, 13, 8, 3

$d = -5$

Write the first five terms of each sequence described.

1) The first term of the sequence is 8 and the common difference is 12.

8, 20, 32, 44, 56

2) The first term of the sequence is -9 and the common difference is -2.

-9, -11, -13, -15, -17

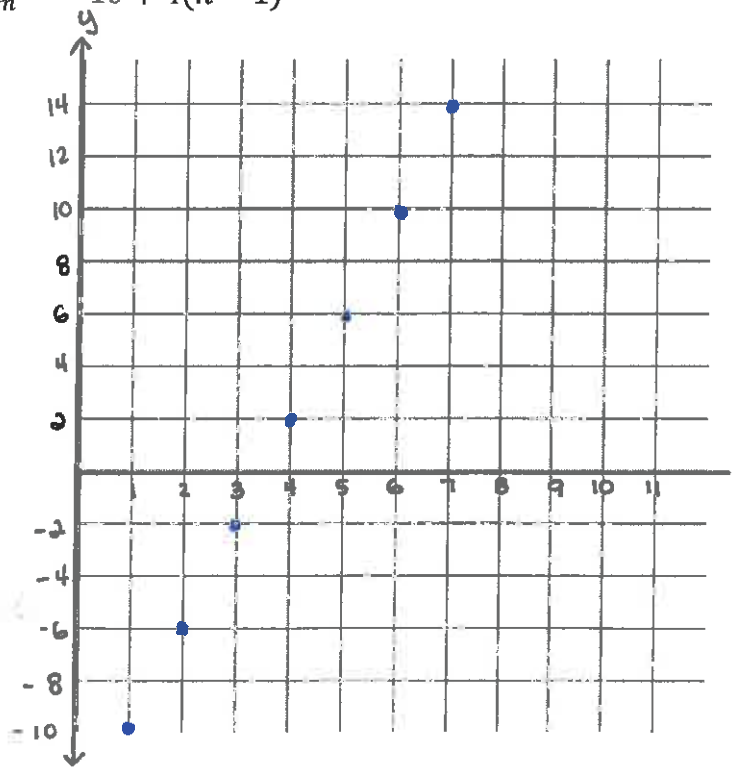
Graphs of Arithmetic Sequences are linear.

Example: Complete the table for sequence a and then graph.

$a_n = -10 + 4(n-1)$

Term Number(n)	Term Value
1	-10
2	-6
3	-2
4	2
5	6
6	10
7	14
8	18
9	22
10	26

Plug in



Function Family

- linear
- discrete