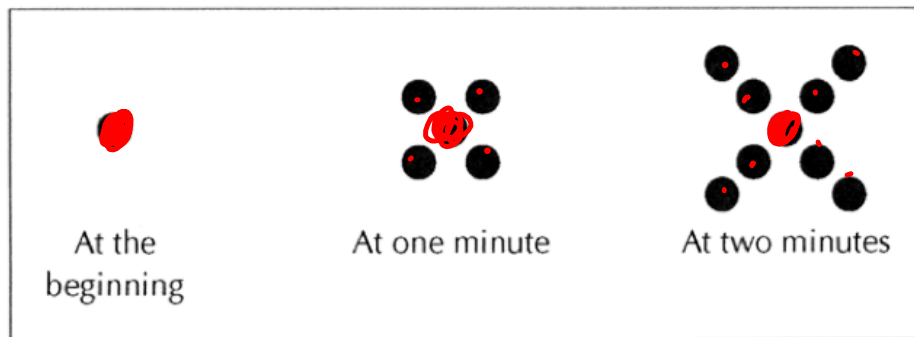# 6-1 Arithmetic Sequences

Objectives

I can identify an arithmetic sequence.

I can write an arithmetic sequence as an explicit and recursive equation

Vocabulary - Common Difference, Term, initial value, explicit, recursive, arithmetic

| At the beginning | At one minute | At two minutes |

1. Describe the pattern that you see in the sequence of figures above.

each minute adds 4 dots

2. Assuming the sequence continues in the same way, how many dots are there at 3 minutes? At 4 minutes?

y dots	1	5	9	13	17
x min	0	1	2	3	4

3. Write an equation to represent the pattern

$$X + 4$$

$$f(x) = (x) + 4$$

$$y = 4x + 1$$

explicit

$$\frac{1}{4}$$

RECURSIVE

4. Make a table of values and graph

previous picture

X	y dots
0	1 y int
1	5 +4
2	9 +4
3	13

+1
+1
+1
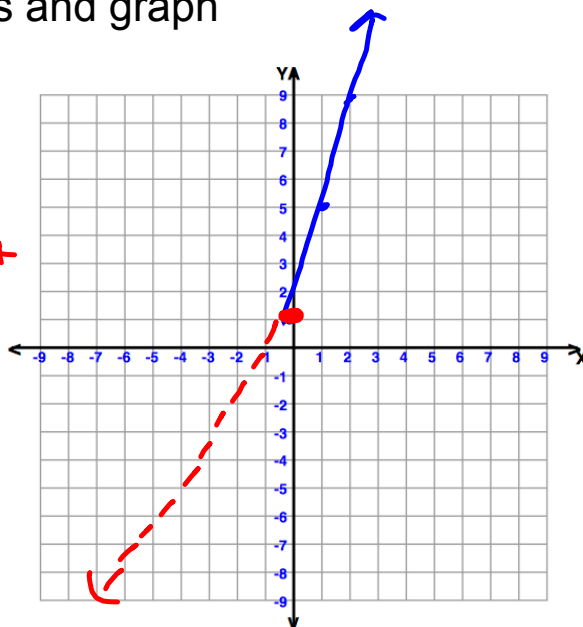
Given the following sequences of numbers, determine the change from term to term and state the next 2 numbers.

2, 5, 8, 11, 14,....17, 20

add 3

7, 3, -1, -5,....-9, -13

SUBTRACT
-4

Vocabulary

Arithmetic: Sequence that add or subtract

Common Difference: d, what you add or subtract

Initial Value: a, the 0th term

Explicit Equation: $f(n) = dn + a$

n = term number

Recursive Equation:

$f(n-1)$ previous term, $f(n)$ term, $f(n+1)$ next term

* $f(n) = f(n-1) \pm d$

* $f(0) = a$

Find the next 3 terms in each sequence. Identify the constant difference. Write a recursive equation and an explicit equation for each sequence. (The first number is the 1st term, not the 0th). Circle the constant difference in both functions.

$+5+5\ldots$

4. 3 , 8 , 13 , 18 , 23 , _____ , _____ , _____ , ...   Constant Difference: $i.v.: -2$ 5

Recursive Equation: $f(n) = f(n-1) + 5$ Explicit Equation: $f(n) = 5n - 2$
$f(0) = -2$

5. 11 , 9 , 7 , 5 , 3 , _____ , _____ , _____ , ...   Constant Difference: $iv: 13$ -2

Recursive Equation: $f(n) = f(n-1) - 2$ Explicit Equation: $f(n) = -2n + 13$
$f(0) = 13$

6. 3 , 1.5 , 0 , -1.5 , --3 , _____ , _____ , _____ , ...   Constant Difference: $iv: 4.5$ -1.5

Recursive Equation: $f(n) = f(n-1) - 1.5$ Explicit Equation:
$f(0) = 4.5$ $f(n) = -1.5n + 4.5$

-2 3 , 8 , 13 ....
OTH   1ST

x	0	2	4	6
y	-5	-3	-1	1

Common Difference:

Next Term:

Explicit Equation:

Recursive Equation:

x	y
0	11
1	8
2	5
3	2
4	−1

Common Difference: -3

I.V.: 11

Next Term: -1

Explicit Equation: $f(n) = -3n + 11$

Recursive Equation: $f(n) = f(n-1) - 3$
$f(0) = 11$

x 0	y -1
1	3
2	7
3	11
4	15

Common Difference: $+4$ $i \ v : -1$

Explicit Equation: $f(n) = 4n - 1$

Recursive Equation: $f(n) = f(n-1) + 4$
$f(0) = -1$

Scott has decided to add push-ups to his daily exercise routine. The bar graphs below show his recorded push-ups each day.

9

7

5

3

0

1   2   3   4

How many push-ups will he do on day 10?

21

$d = 2$ i. v. $= 1$

Write an explicit and recursive equation for the number of push-ups Scott does

Rec

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

$f(0) = 1$

Exp

$f(n) = 2n + 1$

$f(10) = 2(10) + 1 = 21$

200 days : $f(200) = 2(200) + 1$

$= 401$

Write your own example of an arithmetic sequence. Then have your neighbor write the explicit and recursive equations for the sequence you created.