Unit 4- Day 1: Arithmetic Sequences

Objective: I can identify and extend patterns in sequences.
I can represent arithmetic sequences using function notation.

Review: Solve for y.

1.) $2y = -3x + 8$

$\frac{2y}{2} = \frac{-3x+8}{2}$

$y = \frac{-3x+8}{2}$ or $y = \frac{-3x}{2} + 4$

2.) $-5y - 10x = 5x + 5$

$+10x \quad +10x$

$\frac{-5y}{-5} = \frac{15x+5}{-5} = \frac{15x}{-5} + \frac{5}{-5}$

$y = -3x - 1$

Sequence: An ordered list of numbers.

Each number in the list is called a term of sequence

Example:

5, 8, 11, 14 or 3, 9, 27, 81

Example #1: Describe the pattern in each sequence. Then find the next two terms of the sequence.

a.) 3, 6, 12, 24, …

×2 ×2 ×2

48, 96

b.) 12, 7, 2, -3, …

-5 -5 -5

-8, -13

c.) 40, 20, 10, 5, …

÷2 ÷2 ÷2

$\frac{5}{2}$ or 2.5, 1.25 or $\frac{5}{4}$

Arithmetic Sequence: A sequence in which the difference between consecutive terms is constant.

add or subtract.

The difference between two consecutive terms is called the common difference

Example:

5, 8, 11, 14

+3 +3 +3

$d = +3$

$d =$

Example #2: Tell whether the sequence is arithmetic. If it is, identify the common difference.

a.) 4, 8, 12, 16, ….

+4 +4 +4

yes

$d = 4$

b.) -11, -5, 0, 6,…

+6 +5 +6

NO

c.) $0, \frac{1}{3}, \frac{2}{3}, 1, \ldots$

$+\frac{1}{3}$ $+\frac{1}{3}$ $+\frac{1}{3}$

yes

$d = \frac{1}{3}$

d.) 12, 23, 34, 45

+11 +11 +11

yes

$d = 11$

Explicit Formula: A function rule that relates each term in a sequence to the term num

$A_n = A(1) + (n-1)d$ → common diff.

A_n: n^{th} term; $A(1)$: 1st term; n: term #

Example #3: Write the explicit formula for the sequences below.

a.) 6, 13, 20, 27, …

+7 +7 +7

$d = 7$

$A(1) = 6$

$A_n = 6 + (n-1)7$

b.) 14, 10, 6, 2, …

$d = -4$

$A(1) = 14$

$A_n = 14 + (n-1)(-4)$

Example #4: Determine the 3rd, 5th and 8th term for the sequences below.

a.) $A_n = 5 + (n-1)3$

$A_3 = 5 + (3-1)3$

$= 5 + (2)3$

$= 5 + 6$

$A_3 = 11$

$A_5 = 5 + (5-1)3$

$= 5 + (4)3$

$= 5 + 12$

$A_5 = 17$

$A_8 = 5 + (8-1)3$

$= 5 + (7)3$

$= 5 + 21$

$A_8 = 26$

b.) $A_n = -1 + (n-1)(-2)$

$A_3 = -1 + (3-1)(-2)$

$= -1 + 2(-2)$

$= -1 - 4$

$A_3 = -5$

$A_5 = -1 + (5-1)(-2)$

$= -1 + 4(-2)$

$= -1 - 8$

$A_5 = -9$

$A_8 = -1 + (8-1)(-2)$

$= -1 + 7(-2)$

$= -1 - 14$

$A_8 = -15$