11/6 Algebra I - Downing

Warm-up

Construct a graph for $f(x) = 3x - 1$ and $g(x) = -x + 3$

Graph each function

$g(x) = -x + 3$ $f(x) = 3x - 1$

$g(7) - f(2)$

$g(7) = -7 + 3$ $f(2) = 3(2) - 1$

$6 - 1$

-4 5

$-4 - 5$

-9

Arithmetic Sequences - a sequence is arithmetic if the difference between each term is constant

Ex) 5, 7, 9, 11 ...

+2 +2 +2

$d = 2$

$a_0 = 3$

$a_1 = 5$ ← 1st Term

$a_2 = 7$

$a_3 = 9$

$a_4 = 11$

$a_n = 2n + 3$

Can find 300th Term ← $a_{300} = 2(300) + 3$

$= 603$

Ex) 12, 9, 6, 3 ...

-3 -3 -3

$d = -3$

$a_0 = 15$

$a_1 = 12$

$a_2 = 9$

$a_3 = 6$

$a_4 = 3$

$a_n = -3n + 15$

Find 1000th Term $a_{1000} = -3(1000) + 15$

$= -2985$

Explicit Formula for Arithmetic Sequences

$$a_n = dn + a_0$$

or

$f(x) = mx + b$ ← slope formula

Determine if the sequence is arithmetic, If yes, determine what the common difference would be.

1) 37, 41, 45, 49, ... $a_0 = 33$ $a_1 = 37$ $a_2 = 41$

+4 +4 +4

$d = 4$

$\boxed{a_n = 4n + 33}$

2) 1, -3, 9, -27, ... Not arithmetic (have to add or subtract by same number)

-4 +12

3) $4, 4\frac{1}{2}, 5, 5\frac{1}{2}, \ldots$ $a_0 = 3\frac{1}{2}$ $a_1 = 4$ $a_2 = 4\frac{1}{2}$

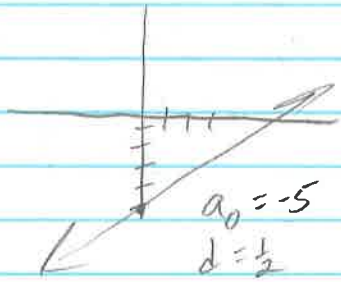
$+\frac{1}{2}$ $d = \frac{1}{2}$

$\boxed{a_n = \frac{1}{2}n + 3\frac{1}{2}}$

Given your first term and the common difference find the next 4 terms and write the explicit formula.

1) $a_1 = -29$ $d = 2$ $a_0 = -31$ $a_1 = -29$ $a_2 = -27$ $a_3 = -25$ $a_4 = -23$ $a_4 = 21$

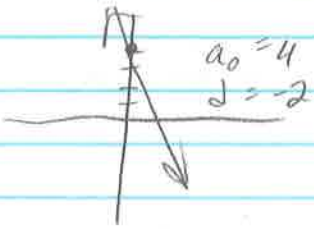
$\boxed{a_n = 2n - 31}$

2) 

$a_0 = -5$

$d = \frac{1}{2}$

$a_n = \frac{1}{2}n - 5$

3) 

$a_0 = 4$

$d = -2$

$a_n = -\frac{2}{1}n + 4$

Ex) 

—, 2, 5, 8, 11

+3 +3 +3

$a_n = 3n - 1$

50th Term

$a_{50} = 3(50) - 1$

$= 150 - 1$

$= \boxed{149}$

HW - Arithmetic Sequences WS