Sequences

①

Arithmetic Sequences

Arithmetic Sequence

- Each term, after the first is found by adding a
  common difference
  (what gets added every time)
- Example: 4, 6, 8, 10, …
  +2 +2 +2

$a_1 \rightarrow$ (value of the first term) 4

$n \rightarrow$ (which term it is)

$d \rightarrow$ (common difference: $a_n - a_{n-1}$)
  $d = 2$

Is the following arithmetic? If so, find the common difference.

- -4, -1, 2, 5, 8, … yes $d = 3$
  +3 +3

- 7, 3, -1, -5, -9, … yes $d = -4$

- 3, 6, 12, 24, … no

- 3, 8 not enough info

Use the recursive formula given to find the first four terms of the arithmetic sequence given.

$$t_1 = 7$$

$$t_n = t_{n-1} - 3$$

$$d = -3$$

$$7, \ 4, \ 1, \ -2,$$

Use the recursive formula given to find the first four terms of the arithmetic sequence given.

$$t_1 = -2$$

$$t_n = t_{n-1} + 6$$

-2, 4, 10, 16...

List the first three terms of the arithmetic sequence below:

explicit

$$t_n = 2n - 3$$

① 2(1)-3   ② 2(2)-3   ③ 2(3)-3   ④ 2(4)-3

-1 , 1 , 3 , 5 ...

List the first three terms of the arithmetic sequence below:

$$t_n = 5 + (n-1)(3)$$

Let's figure out the explicit formula!

1st term: a_1

2nd term: $a_1 + d$

3rd term: $a_1 + d + d = a_1 + 2d$

4th term: $a_1 + 2d + d = a_1 + 3d$

10th term: $a_1 + 9d$

*n*th term:

$$a_n = a_1 + (n-1)d$$

Write an explicit formula for the *n*th term of the arithmetic sequence below:

12, 15, 18, 21, 24, …

$a_1 = 12$

$d = 3$

explicit

$a_n = a_1 + (n-1)d$

$a_n = 12 + (n-1)3$ *plug in & Simplify*

$a_n = 12 + 3n - 3$

$\boxed{a_n = 3n + 9}$

Find the 100th term

$a_n = 3(100) + 9$

$300 + 9$

$\boxed{a_{100} = 309}$

Recursive

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

$\boxed{a_n = a_{n-1} + 3}$

Write an explicit formula for the *n*th term of the arithmetic sequence below:

4, 1, -2, -5, -8, …

Write an explicit formula for the *n*th term of the arithmetic sequence below:

-14, -11, -8, -5, ….