

objective: To define an arithmetic sequence to find the n^{th} term.

Sequence: a set or list of numbers in a specific order. (pattern)

Terms of a sequence:

$$1, 3, 5, 7, 9, \dots, a_n$$

$$a_1 = 1, a_2 = 3, a_3 = 5, a_4 = 7, a_5 = 9$$

Arithmetic sequence: add or subtract the same number each time (common difference) d

example 1: $3, 5, 7, 9, 11, \dots$ $d = 2$

$$5 - 3 = 2 \quad 7 - 5 = 2 \quad 9 - 7 = 2$$

common difference: subtracting previous numbers in sequence

Find the next three terms

$$3, 5, 7, 9, 11, \underline{13}, \underline{15}, \underline{17}$$

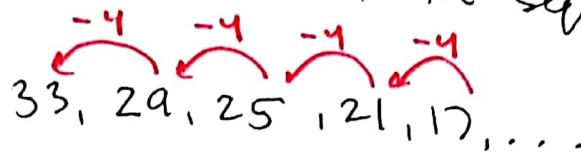
Formula to find the n^{th} term of an ~~arithm~~ arithmetic sequence.

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

n^{th} term 1st term in sequence term number common difference

Example 1: Find the rule (formula) to find the n^{th} term of the sequence.

33, 29, 25, 21, 17, ...



steps

- 1.) Find the 1st term (a_1)
- 2.) Find common difference (d)
- 3.) plug into formula and simplify.

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

$$a_1 = 33$$

$$d = -4$$

$$a_n = 33 + (n-1)(-4)$$

$$a_n = 33 - 4n + 4$$

$$\boxed{a_n = -4n + 37}$$

$$y = mx + b$$

a_{10} = 10th term = plug in 10 for n .

$$a_{10} = -4(10) + 37$$

$$a_{10} = -40 + 37 = -3$$

$$\boxed{a_{10} = -3}$$