

## Linear sequences

"the interval between values is constant".


The  $n^{\text{th}}$  term formula looks like  $an+b$  where  $a$  and  $b$  are numbers, eg  $2n+5$ .

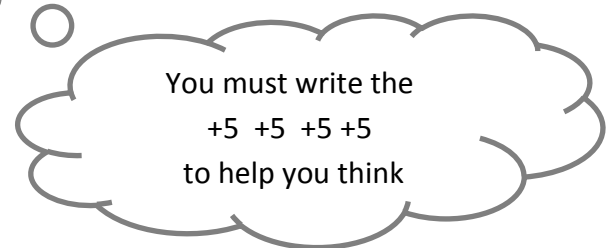
The formula  $2n+5$  will produce a sequence 7, 9, 11, 13, 15,... (first 5 terms,  $n = 1, 2, 3, 4, 5$ ).

### Finding the formula

e.g. "Find the formula for the  $n^{\text{th}}$  term for the sequence 6, 11, 16, 21, 26..."

Position $n$	1	2	3	4	5			$n$
Value	6	11	16	21	26			?

Increase:  $\rightarrow$   +5 +5 +5 +5



The "+5" increase tells us the formula for the  $n^{\text{th}}$  term must be  **$5n + \text{something}$**

Now think how to get the first term 6 when  $n = 1$ .

$6 = 5 \times 1 + 1$ , we need to have the "something" = 1.

The final formula for the value of the  $n^{\text{th}}$  term is  **$5n + 1$**

### Examples

(a) Sequence 1, 4, 7, 10, 13, the increase is +3 each time so we need  **$3n + \text{something}$** .

To make the first term = 1, we think  $1 = 3 \times 1 - 2$ , the formula is  **$3n - 2$**

(b) Sequence 5, 3, 1, -1, -3, the increase is -2 each time and the formula is  **$-2n + 7$**