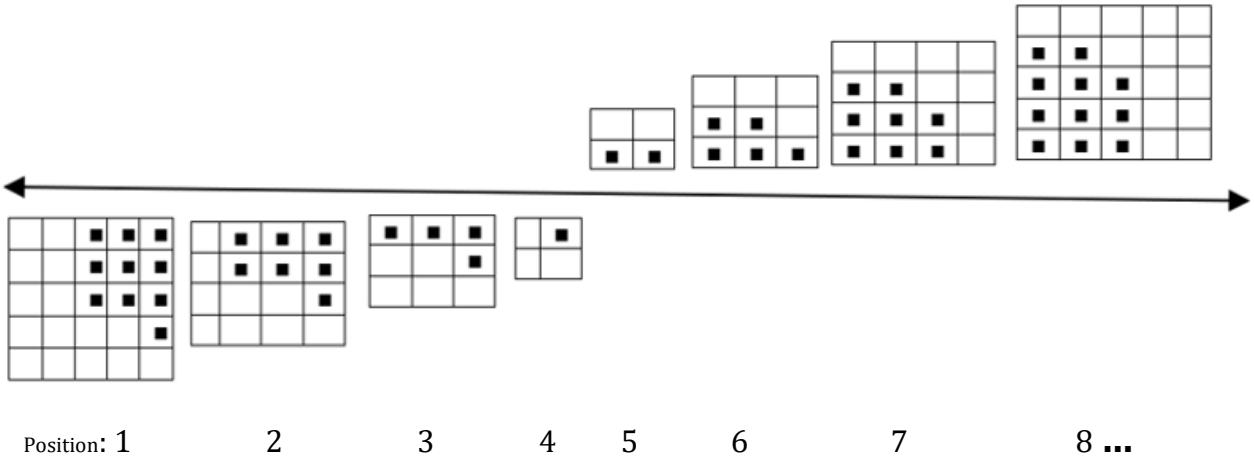
## LINEAR SEQUENCE




1.1 The square grids below the continuous line depict negative numbers and those above the line positive numbers. Study the square grids shown above with **black squares** forming a pattern. How is the pattern growing? Create square grids 9, 10 and 11; complete them with **black squares** to further develop the pattern.

1.2 How many small **black squares** are in the grids in the $9^{th}$, $10^{th}$ and $11^{th}$ positions?

1.3 Can you predict the number of small **black squares** in the grids in the $50^{th}$ and $100^{th}$ positions?

1.4 What numerical number pattern can be formed from the **black squares** in each grid?

1.5 Obtain the general term, $T_n$, for this number pattern.

1.6 What is the mathematical name given to this kind of number pattern?

1.7 If there are 602 black squares in a square grid, determine n, the position of the square grid.

## HELP

Study the following number pattern: -3, -1, 1, 3, 5, 7, …

Workout the differences between any two consecutive terms of the number pattern.


What do you notice? What can you say about these differences?

2 4 6 8 10 12 …. Multiples of 2 i.e. 2n

-3, -1, 1, 3, 5, 7, ... 2n – 5. **Notice that all these numbers are 5 less than the multiples of 2 (i.e. 2n), hence 2n – 5.**

**First differences….**

Can you confirm that the $n^{th}$ term of this number pattern is 2n – 5? How can you confirm that?

What is the $10^{th}$ term, $20^{th}$ term and the $100^{th}$ term?

Is 200 a term of this sequence? Justify your answer.

How about 245, can it be a term of this sequence? Justify your answer.

## NEXT

Can you create a similar number pattern which develops in such a way that the consecutive terms have a constant difference?

What is the rule of your number pattern?

What are the next two terms of your pattern?

Can you come up with the $n^{th}$ term?

Find the $50^{th}$ term of your sequence?

Is 172 (or any number of your choice picked at random) a term of the sequence?