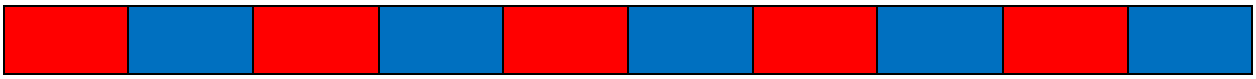
Counting Stick Conjectures



How many rectangles are there?

(1) What was Zoya's thinking?

Zoya tried to count them all up but got very confused. This was because she didn't have a methodical way of working it out.

My top tip for Zoya would be:

Think about it in a logical way and have a plan of how you are going to work it out before diving straight into counting them.

(2) What about Max? What did he do to try and solve this?

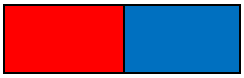
I think Max's method is a very clear way to do it and it seems like it would work.

I am going to try out Max's method to see if I can find a pattern.

Max already said:

= 1 small rectangle

= 1



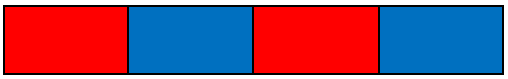
= 2 small rectangles, and one larger rectangle.

= 3

= 3 small rectangles, 2 medium rectangles and 1 larger rectangle.

= 6

This would mean that 4 small rectangles would be:



= 4small rectangles, 3 medium rectangles, 2 large rectangles, and 1 larger rectangle.

=10

Our sequence so far goes – 0, 1, 3, 6, 10

We add 1, then 2, then 3, then 4...

This is the pattern

But is there an easier way to find 10 small rectangles than just counting up in the sequence? What if we wanted to find the answer to 100 small rectangles?

THE nTH TERM

What is the nth term in this sequence?

This sequence is called the triangular sequence. The number that you add increases by 1 every time.

The formula for this is:

(n)*(n+1)/2

In other words, you take the number that you were trying to find out and then times it by itself plus one, before dividing it by 2.

Let's see if this works.

Our sequence – 1, 3, 6, 10, 15, 21, 28, 36, 45, 55

There are 55 rectangles in a counting stick.

Let's test it with the other method.

10+1=11

11*10=110

110/2=55

It works.

There are 55 rectangles on a counting stick and the formula is (n)*(n+1)/2.