Sequences Challenges

Sequence:

3, 5, 7, 9, ...

1st term

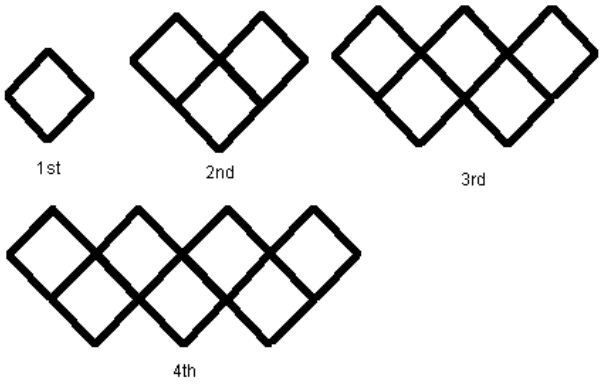
2nd term

3rd term

4th term

three dots means goes on forever (infinite)

("term", "element" or "member" mean the same thing)



+2 +2 +2 +2 +2 +2

2, 4, 6, 8, 10, 12, 14

Challenge 1

Write down the next two numbers in each of these sequences and write down your reasons?

2, 5, 8, 11, …, …

3, 8, 13, 18, …, …

1, 8, 15, 22, …, …

15, 8, 1, -6, …, …

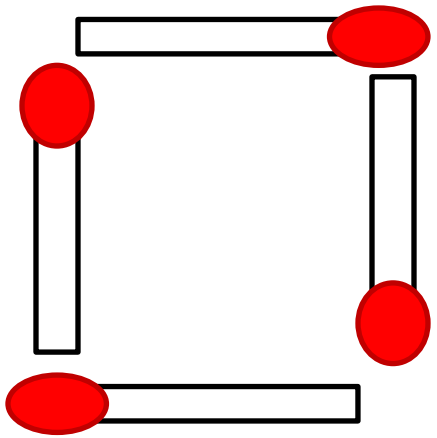
1, 2, 4, 8, …, …

18, 14, 10, 6, …, …

Challenge 2

Draw the next 4 diagrams and complete the table of results

Pattern number	1	2	3	4	5
Matches used	4				



Challenge 3

Complete these sequences and write down your reasons?

7, 10, …, …, …, 22

9, …, 21, …, 33, …

1, …, …, …, 17, 21

6, …, …, …, …, 26

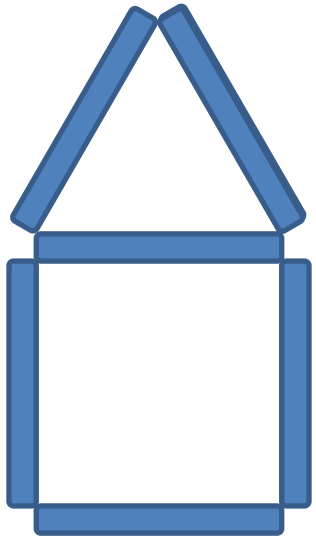
…, …, 10, …, 12, …

…, 7, …, …, -8, …

Challenge 4

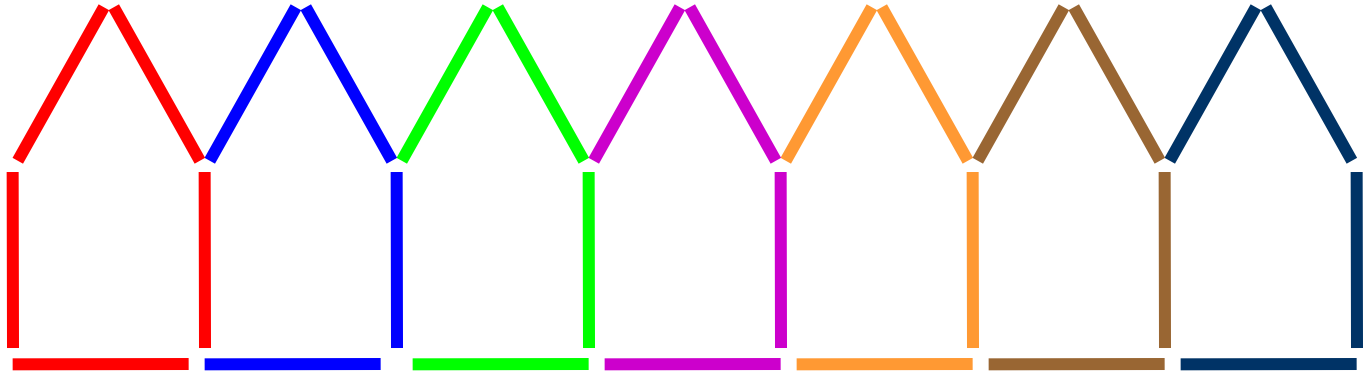
How many matches needed for the 10th diagram?

Pattern number	1	2	3	4	5
Matches used	6				



Challenge 5

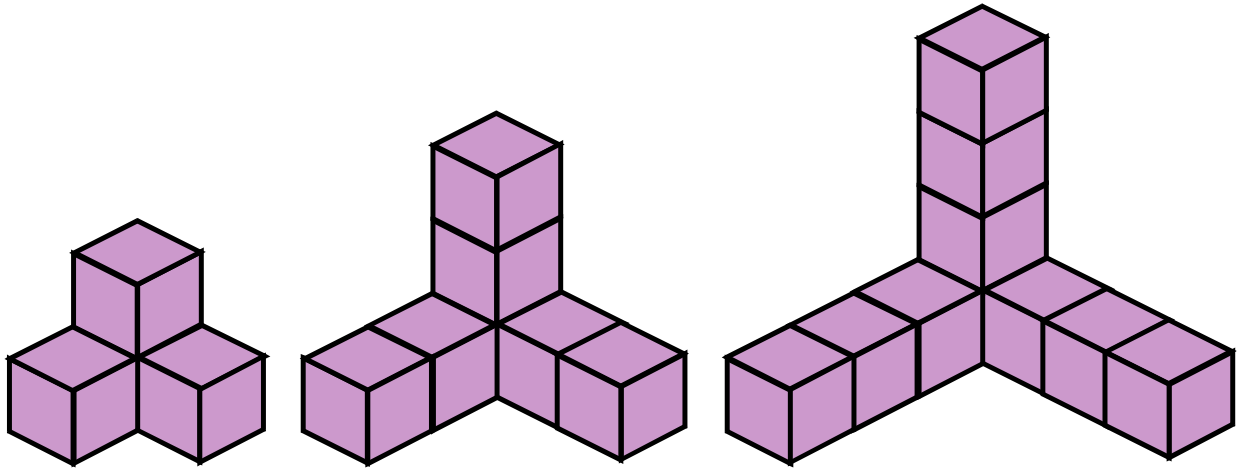
Plot the points (1,5) (2,9) etc on a set of axes.
What do you notice and why does it happen?



Pattern number	1	2	3	4	5	6	7
Number of sticks	5	9	13	17	21	25	29

Challenge 6

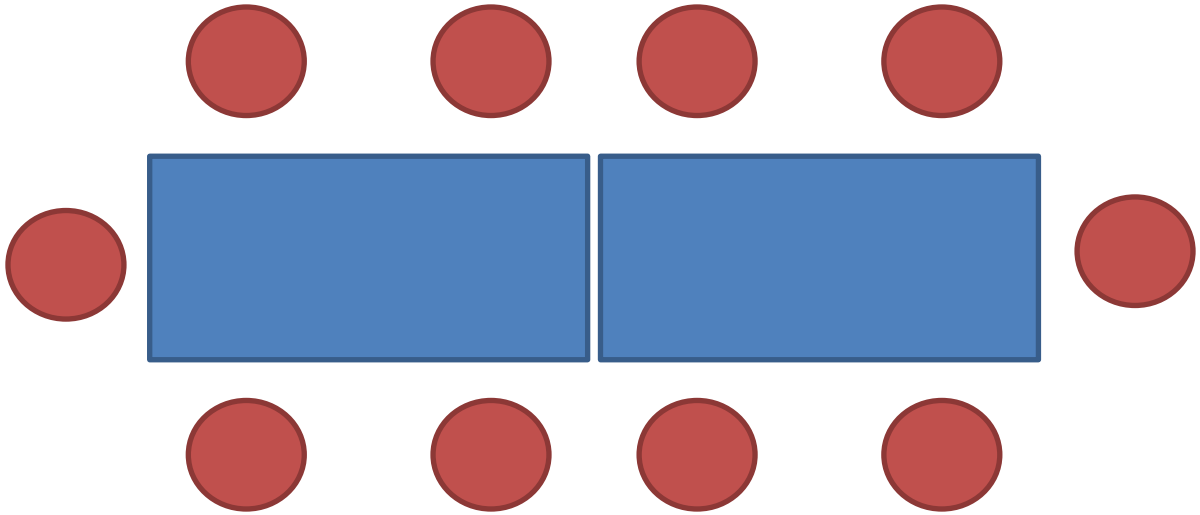
Complete the table below?



Shape	1st	2nd	3rd	4th	5th	*20*th
3 x table	3					
No. of Cubes	4	7	10	13	16	

Challenge 7

How many chairs would you need if there were 50 tables?



Challenge 8

The 1^{st} term of a sequence is 7 and the 5^{th} term is 33.

What is the 60^{th} term?

Challenge 9

Write down the first 5 numbers in each of the sequences described below?

$3n + 1$ $2n + 5$ $12 - 3n$

$4n - 3$ $n + 3$ $7n + 6$

Challenge 10

Match the sequence with the formula?

-1, 4, 9, 14, …	4n + 5
8, 15, 22, 29, …	7n + 1
9, 13, 17, 21, …	2n + 3
5, 7, 9, 11, …	5n – 6

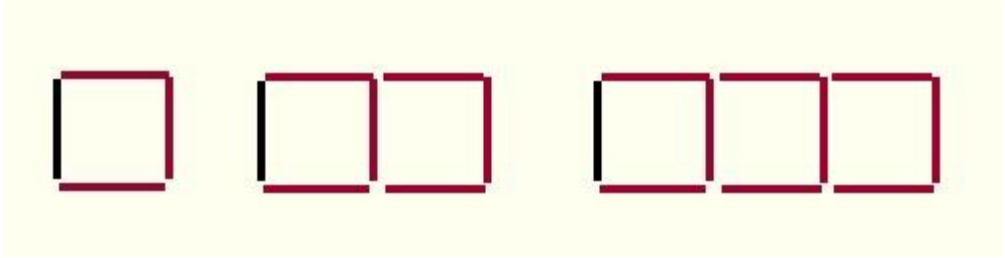
Challenge 11

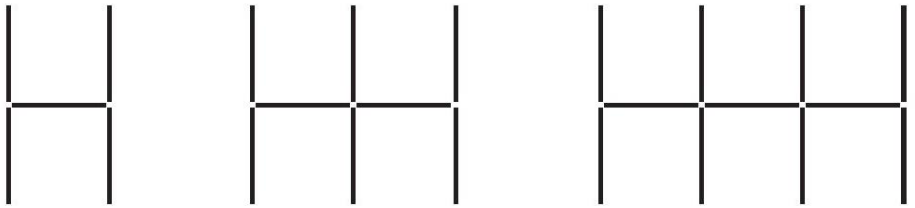
Find the formula that gives the nth term

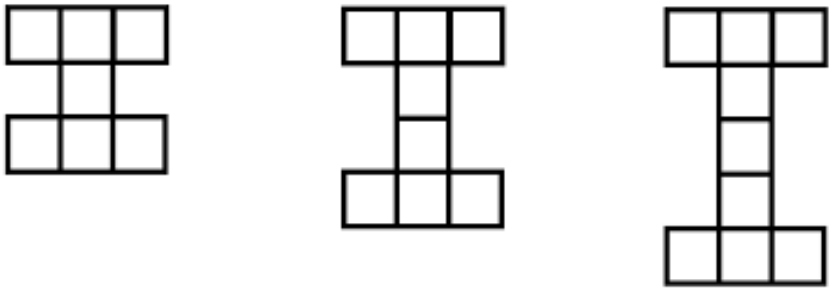
Term	1st	2nd	3rd	4th	5th	…	nth
	2	8	14	20	26		
	7	12	17	22	27		
	9	11	13	15	17		
	-3	-2	-1	0	1		
	3	4	5	6	7		

Challenge 12

Find the 3 formulas that give the number of matches needed for these patterns







Challenge 13

By looking at the diagrams below work out how many squares, dots or matches in diagram 50

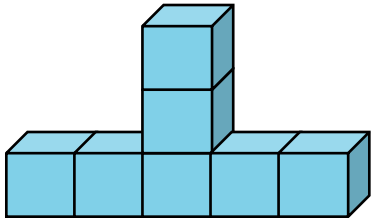


Diagram 2

Diagram 3

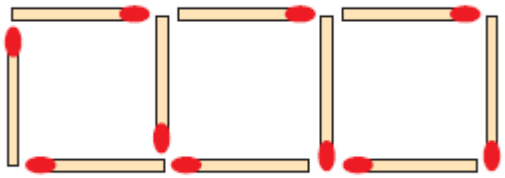


Diagram 3

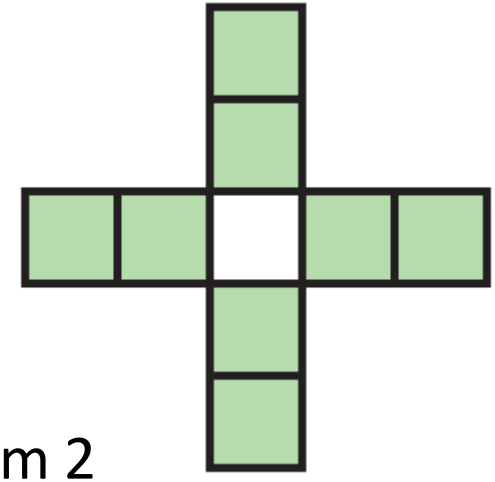


Diagram 1

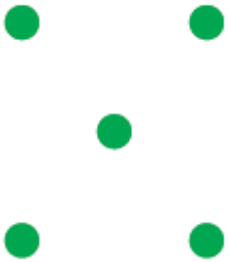
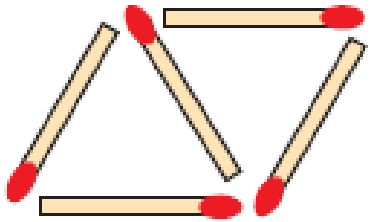


Diagram 2



Challenge 14

Explore this further