

PATTERNS & RELATIONSHIPS

Extending Patterns

You should be able to extend simple linear patterns:

e.g. 3, 5, 7, 9, 11, , ,

In this sequence the numbers increase by 2.

3, 5, 7, 9, 11, , ,
+2 +2 +2 +2

Continuing the pattern we can find the next terms in the sequence:

3, 5, 7, 9, 11, 13, 15, 17.....

Special Non-Linear Number Sequences

Square Numbers – 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.....

Cubic Numbers – 1, 8, 27, 64, 125.....

Triangular Numbers – 1, 3, 6, 10, 15, 21, 28, 36, 45.....

Fibonacci Sequence – 1, 1, 2, 3, 5, 8, 13, 21, 34.....

Finding the Formula

Look at the pattern below:



Complete the table below to show the number of dots in the next patterns:

| | | | | | | |
|----------------|---|---|---|----|---|---|
| Pattern Number | 1 | 2 | 3 | 4 | 5 | 6 |
| Number of Dots | 1 | 5 | 9 | 13 | - | - |

By extending the pattern on the bottom row of the table we can see that the fifth pattern will have 17 dots and the sixth pattern will have 21 dots.

We can find a formula connecting the pattern number with the number of dots.

The bottom row of the table is a linear pattern that increases by 4 therefore the multiplier in the formula is 4.

If we multiply the top row by 4 we get the sequence: 4, 8, 12, 16, 20, 24.....

This is not the same as the bottom row, we must now subtract 3 from the sequence above.

So the rule is:

$$\text{Number of dots} = 4 \times \text{Pattern Number} - 3$$

As a formula:

$$D = 4P - 3$$

Patterns & Relationships Practice

http://www.cimt.plymouth.ac.uk/projects/mepres/book7/bk7i13/bk7_13i2.htm

Learn about extending number sequences.

http://www.cimt.plymouth.ac.uk/projects/mepres/book7/bk7i13/bk7_13i3.htm

Learn about extending matchstick patterns.

<http://www.mathsisfun.com/numberpatterns.html>

Learn about different types of number patterns.

http://www.bbc.co.uk/bitesize/ks3/maths/algebra/number_patterns/revision/1/

Learn about number patterns, try the test.