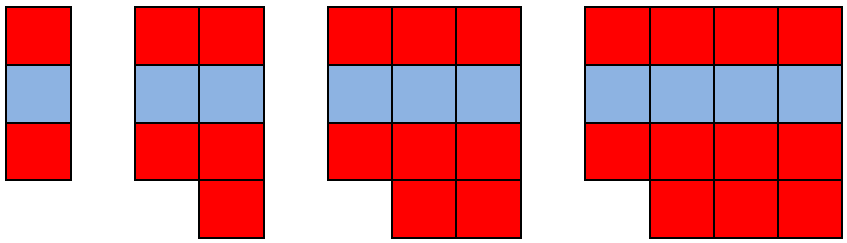
Monifieth High School Maths Department

Level 4: Formulae

1) Learn how to find a formula given a table of values, for example: -



Number of blue squares (B)	1	2	3	4
Number of red squares (R)	2	5	8	11

+3 +3 +3

Notice that the number of red squares is "going up in threes": this means the formula is based on the three times table. However, the number of red squares is not quite three times the number of blue squares, it is one less.

Formula: $R = 3B - 1$

How many red squares would there be in a pattern with 29 blue squares?

$$\begin{aligned} R &= 3B - 1 \\ &= 3 \times 29 - 1 \\ &= 86 \end{aligned}$$

There will be 86 red squares.

How many blue squares would there be in a pattern with 29 red squares?

$$\begin{aligned} 3B - 1 &= R \\ 3B - 1 &= 29 \\ 3B &= 30 \\ B &= 10 \end{aligned}$$

There will be 10 red squares.

2) Be aware that other types of formula exist, for example: -

If $R = S^3 + 10$, find R when S = 7.

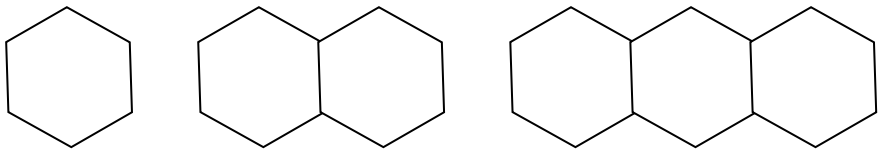
$R = S^3 + 10 = 7^3 + 10 = 353$

If $P = 3Q^2 - Q$, find P when Q = 5.

$P = 3 \times 5^2 - 5 = 3 \times 25 - 5 = 70$

3) Solve problems such as: -

This table tells how many corners there are in various hexagon patterns:-



Pattern 1 Pattern 2 Pattern 3

Number of hexagons (H)	1	2	3	4	5
Number of corners (C)	6	10	14		

a) How many corners should the fourth pattern have?

b) How many corners should the fifth pattern have?

c) Write a formula for the number of corners: C =__H_____.

d) Use the formula to work out how many corners the twelfth pattern has.

e) Use the formula to work out which pattern has 102 corners.

REMEMBER TO SHOW ALL YOUR WORKING
AND EXPLAIN YOUR ANSWER FULLY!