| **As outcomes, Year 8 pupils should, for example:** | **As outcomes, Year 9 pupils should, for example:** |

Given inputs and outputs, find the function. Given a linear function, put random data in order and use difference patterns to help find the function. For example, find the rule:

- 2, 3, 5, 1, 4 → [?] → [?] → 5, 7, 11, 3, 9

Reorganise the data:

Input (x)	1		2		3		4		5
Output (y)	3		5		7		9		11
Difference		2		2		2		2	

Recognise differences of 2. Try $x \to 2x + c$.
From the first entry, find that $c = 1$.
Check other values.

- 5, 11, 3, 15, 7 → [?] → [?] → 15, 27, 11, 35, 19
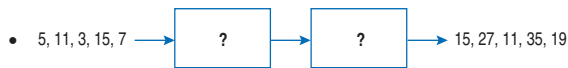
Reorganise the data:

Input (x)	3		5		7		11		15
Output (y)	11		15		19		27		35
Difference		4		4		8		8	

Recognise that the first two differences are 4, where x is increasing by 2 each time.
Try $x \to 2x + c$. From the first entry, find that $c = 5$.
Check other values.

Link linear functions to linear sequences, particularly difference patterns (pages 148–51).
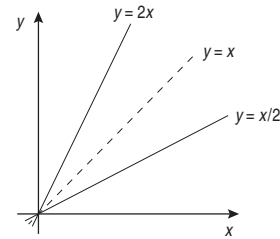
Know some properties of functions produced by combining number operations. For example:

- Two additions, two subtractions, or an addition with a subtraction, will simplify to a single addition or subtraction.
- Two multiplications, two divisions, or a multiplication with a division, will simplify to a single multiplication or division.
- A function may often be expressed in more than one way, e.g.
  $x \to 2x - 2$ is equivalent to $x \to 2(x - 1)$.
- Changing the order of two operations will often change the function, e.g.
  $x \to 3x - 4$ is different from $x \to 3(x - 4)$.
- The inverse of two combined operations is found by inverting the operations and reversing the order, e.g.
  the inverse of $x \to 2(x - 1)$ is $x \to x/2 + 1$.

Link to inverse operations, equations and formulae (pages 114–15).

Plot the graph of a linear function, together with its inverse, on paper or using **ICT**. For example:

Observe the relationship between the two graphs: each is the reflection of the other in the line y = x.

Know some properties of quadratic functions and features of their graphs. For example:

- The graph is a curve, symmetrical about the vertical line through its turning point.
- The value of the y-coordinate at the turning point is either a maximum or a minimum value of the function.
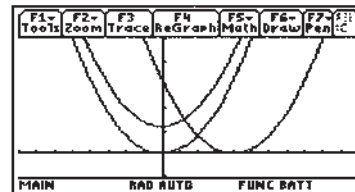
Link to properties of quadratic sequences (pages 152–3), and plotting graphs of simple quadratic and cubic functions (pages 170–1).