

Essential knowledge

Know the difference between linear and non-linear sequences.

Know inverse operations.
Know correct algebraic notation.

Key Vocabulary

Sequence: items or numbers put in a pre-decided order

Term: a single number or variable

Rule: instructions that relate two variables

Linear: the difference between terms increases or decreases by the same value each time

Inverse: the operation that undoes what was done by the previous operation. (The opposite operation).

Expression: a maths sentence with a minimum of two numbers and at least one math operation (no equals sign)

Prior learning links

Recognising patterns
Number facts such as multiplications.
Function Machines, Bar Modelling
Inverse Operations

Non Linear Sequences

1, 2, 4, 8, 16 ...

How do I know this is a non-linear sequence?

It increases by multiplying the previous term by 2. – this is a geometric sequence because the constant is multiply by 2

How many terms do I need to make this conclusion? At least 4 terms – two terms only shows one difference not if this difference is constant. (a common difference).

Linear Sequences- Increase or decrease by the same amount each time

Linear Sequences 7, 11, 15, 19...

How do I know this is a linear sequence? It increases by adding 4 to each term.

How many terms do I need to make this conclusion? At least 4 terms – two terms only shows one difference not if this difference is constant. (a common difference).

How do I continue the sequence? You continue to repeat difference for each term

Algebraic notation

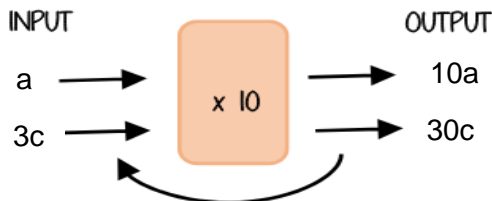
$$\begin{array}{l} 5 + 5 + 5 \\ 3 \times 5 \\ 5 \times 3 \end{array}$$

$$\begin{array}{l} y + y + y + y \\ y \times 4 \\ 4 \times y \\ 4y \end{array}$$

$$\begin{array}{l} 20 \div h \\ \frac{20}{h} \end{array}$$

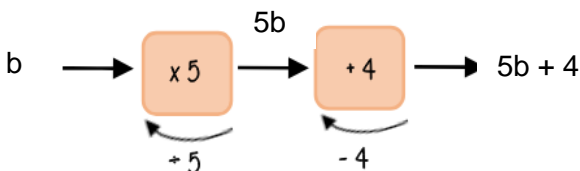
In Algebra we do not write the multiplication sign or the division sign. If a number is next to a letter it has been multiplied e.g. 5a means 5 multiplied by a. Divides are written as fractions.

Function machines with Algebra (Finding inputs and Outputs).



$\div 10$ is inverse to find input

The inverse of adding is subtracting. Subtracting is adding. The inverse of multiplying is dividing and dividing is multiplying. If you have an output and do the inverse you will find the input.



Substitution into expressions.

When we substitute into expressions we replace a letter with a number.

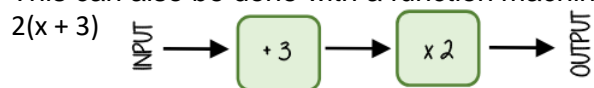
4y means 4 lots of 'y'

If $y = 7$ this means the expression is asking for 4 'lots of' 7

4×7 OR $7 + 7 + 7 + 7$ OR $7 \times 4 = 28$

e.g. : $y - 2 = 7 - 2 = 5$

This can also be done with a function machine.



If $x = 10$ $10 + 3 = 13$ $13 \times 2 = 26$

Prior learning links

$5 \times 7 = \quad 4 \times 9 = \quad 6 \times 12 = \quad 4 \times 8 =$

Fill in the blanks

$6 + _ = 9 \quad 12 - _ = 5 \quad 7 \times _ = 56$

Write the number sentences for the bar model below



Non Linear Sequences

Find the next term in each geometric sequence

2, 10, 50...

5, 15, 45, 135...

200, 50...

64, 96, 144...

Function machines

Find the outputs by writing the algebraic expressions.

$x \xrightarrow{\times 5} \xrightarrow{-3} \rightarrow$

$e \xrightarrow{+7} \xrightarrow{\div 2} \rightarrow$

$i \xrightarrow{\times 2} \xrightarrow{+3} \xrightarrow{\div 7} \rightarrow$

Find the inputs by doing the inverse.

INPUT	?	- 7	▶	OUTPUT	10
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INPUT	?	+ 2	▶	OUTPUT	21
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Key Vocabulary

Define the following key words:

Sequence

Term

Rule

Linear

Inverse

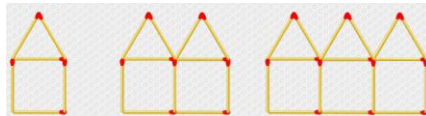
Expression

Linear sequences

Write the next three terms and the rule.

- a) 7, 10, 13,
- b) 10, 8, 6,
- c) 14, 18, 22
- d) -6, -4, -2

Draw the next pattern.



Algebraic notation

Write the meaning of the following expressions.

- a) $4a$
- b) $6 + a$
- c) $a + 6$
- d) $a - 2$

Write the expression for the following.

- a) 3 more than c
- b) y divided by 9
- c) 4 multiplied by 4
- d) 7 less than x

Substitution into expressions

If $a = 1$ $b = 2$ and $c = 3$ find the value of the following expressions.

- a) $a + b$
- b) $2b$
- c) ac
- d) $ab + c$
- e) $c - a$