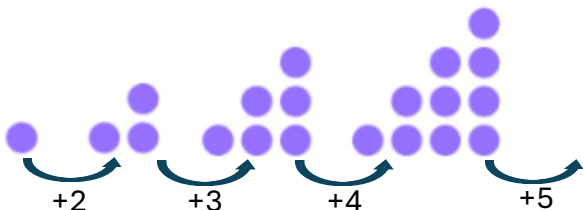


## Week 1

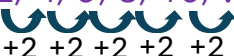
A **sequence** is a list of items in a certain order that follows a rule or pattern.

You can have picture sequences  
E.g.



or you can have number sequences

E.g.  $2, 4, 6, 8, 10, \dots$



Each item in the sequence is called a **term**

You can find the next term by looking at the difference between each term

## Week 2

A **linear sequence** is when the difference between each term is constant.

E.g.  $4, 9, 14, 19, 24, \dots$



It can also be called an **arithmetic** sequence.

A **non-linear sequence** is when the difference between each term is **not** constant. E.g.  $56, 55, 53, 50, 46, \dots$



The difference is called the **term-to-term rule**.

A **geometric sequence** occurs when the term-to-term rule is multiply or divide.

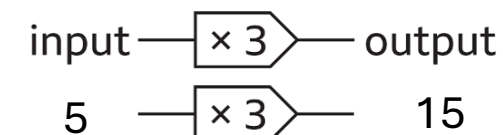
E.g.  $2, 4, 8, 16, 32, \dots$



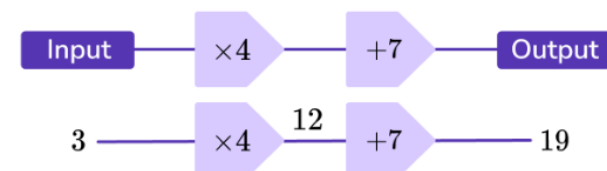
## Week 3

A **function machine** is a way of writing out a calculation to show the steps needed in the correct order.

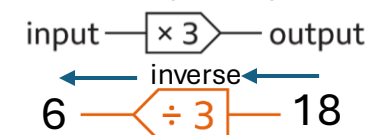
E.g. One-step function machine



E.g. Two-step function machine



You can also work backwards from the output to find the input by using the **inverse**



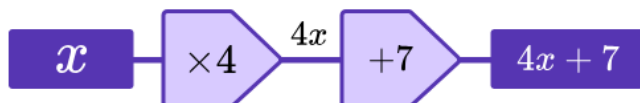
## Year 7 Maths Topics 1, 2 & 3 Introduction to Algebra

## Week 4

In maths we use letters to represent unknown numbers. This is called **algebra**. We call the letter the **variable**

We can use algebra in our function machines to make an expression. An **expression** is a collection of numbers and letters without an equals symbol.

E.g.



Here  $x$  can be any number.

We can substitute  $x$  for any number to get an answer. **Substitute** means swap one thing for another thing, (in this case a letter for a number).

E.g. When  $x = 4$ ,  $5x - 2 = (5 \times 4) - 2 = 20 - 2 = \mathbf{18}$

## Week 5

We can solve an equation by doing the **inverse** (opposite) function. **Solve** means find out the value of the letter.

The inverse of addition is subtraction.  
The inverse of multiplication is division.  
The inverse of squaring is the square root.

E.g.  $6y = 24$                        $z + 7 = 15$   
 $\div 6$        $\div 6$                        $-7$        $-7$   
 $y = 4$                                        $z = 8$

When solving an equation you have to do the same to both sides to keep it equal.

## Week 6

We can simplify expressions by collecting like terms. **Like terms** are terms that have the same variable and the same power  
E.g.  $5x$  and  $8x$  are like terms and  $y^2$  and  $2y^2$  are like terms

We can combine these terms together to make one term. We do this by adding or subtracting the front number.

E.g.  $5x + 8x \equiv 13x$        $5y^2 + 2y^2 - 4y^2 \equiv 3y^2$

**Unlike terms** cannot be combined together. Unlike terms have a different variable (letter) or different power.

Eg.  $5x$  and  $8y$  are unlike terms and  $y^2$  and  $y^3$  are unlike terms

$7x + 8y - 2x \equiv 5x + 8y$

## Week 1

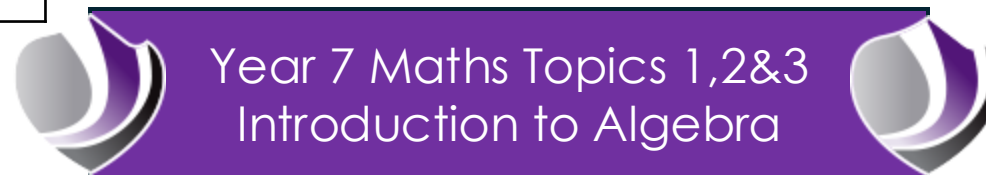
Questions	Answers
<b>What is a sequence?</b>	A sequence is a list of items in a certain order that follows a rule or pattern.
<b>What do you call each item in the sequence?</b>	Each item in the sequence is called a term.
<b>How do you find the next term of a sequence?</b>	You find the next term by looking at the difference between each term and continuing the pattern.
<b>Does a sequence have to be a list of numbers?</b>	A sequence isn't just a list of numbers, there can also be picture sequences.
<b>Does the difference always have to be the same?</b>	The difference doesn't always have to be the same but it will still follow a pattern.

## Week 2

Questions	Answers
<b>If the difference is not the same what kind of sequence is it?</b>	When the difference is not the same every time it is a Non-linear sequence.
<b>What can you tell me about the difference in a linear sequence?</b>	The difference in a linear sequence is always the same (constant).
<b>An arithmetic sequence is another name for what kind of sequence?</b>	Arithmetic is another name for a linear sequence.
<b>If the numbers keep multiplying, what kind of sequence is it?</b>	If the numbers keep multiplying it is a geometric sequence.
<b>If I keep adding 5 every time, what sequence is it?</b>	If 5 is added every time it is a linear sequence.

## Week 3

Questions	Answers
<b>What is a function machine?</b>	A function machine is a way of writing out a calculation to show the steps needed in the correct order.
<b>How many calculations do you do in a two-step function machine?</b>	In a two-step function machine you do two calculations.
<b>What do you use to find the input when you know the output?</b>	When you know the output you can use the inverse to find the input.
<b>Does it matter which order you do the functions in?</b>	Yes, the order of calculations are very important as they give different answers.
<b>What is the inverse of multiplying by 3?</b>	The inverse of multiplying by 3 is dividing by 3.



## Week 4

Questions	Answers
<b>What is it called when you use letters in maths?</b>	When we use letters in Maths it is called algebra.
<b>What does variable refer to?</b>	Variable refers to the letter in the calculation.
<b>What does substitute mean in maths?</b>	Substitute means to swap one thing for another, such as a letter for a number.
<b>Give me an example of an expression</b>	An example of an expression is $4x + 7$ .
<b>What is a collection of numbers and letters called without an equals?</b>	An expression is a collection of numbers and letters without an equals.

## Week 5

Questions	Answers
<b>What does solve mean?</b>	Solve means to find out the value of the unknown.
<b>What do you use to solve an equation?</b>	You use the inverse to solve an equation.
<b>What is the inverse of division?</b>	The inverse of division is multiplication.
<b>What is the inverse of addition?</b>	The inverse of addition is subtraction.
<b>Why do you have to do the same to both sides when solving an equation?</b>	You have to do the same to both sides when solving equations to keep it equal.

## Week 6

Questions	Answers
<b>What does simplify mean?</b>	Simplify means making it easier to understand.
<b>What do like terms have to have in common?</b>	Like terms have the same letter (variable) and are the same power.
<b>How do you combine like terms together?</b>	You combine like terms together by adding or subtracting the front number.
<b>Why are <math>5x</math> and <math>8x</math> like terms?</b>	$5x$ and $8x$ are like terms because they have the same letter and it is the same power.
<b>What makes a term unlike another term?</b>	Terms are unlike if they have different letters or if they are different powers.