

1) Times Tables

$7 \times 1 = 7$

$7 \times 2 = 14$

$7 \times 3 = 21$

$7 \times 4 = 28$

$7 \times 5 = 35$

$7 \times 6 = 42$

$7 \times 7 = 49$

$7 \times 8 = 56$

$7 \times 9 = 63$

$7 \times 10 = 70$

$7 \times 11 = 77$

$7 \times 12 = 84$

2) Sequences

A **sequence** is a list of terms formed by following a rule.

Terms are numbers or diagrams within a sequence.

The **position** of a term is where it occurs in a sequence.

“**Term to term rule**” lets you find the next term in a sequence if you know the previous term.

Difference is the numerical difference between two numbers.
e.g. difference in between 8 and 5 is $8 - 5 = 3$

A **linear** sequence has a common difference between all of the terms.
e.g. 4, 7, 10, 13...

A **non-linear** sequence does not have a common difference between terms.
6, 8, 11, 15....

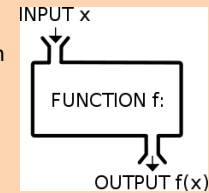
A **geometric sequence** has terms that are multiplied by the same number.
e.g. 3, 6, 12, 24, 48....

An **ascending** (or increasing) sequence goes up.

A **descending** (or decreasing) sequence goes down.

3) Algebraic Notation 1

A “**Function**” machine takes an **input**, applies a rule (operation) then delivers an answer, **output**.



The four basic **operations** are addition, subtraction, multiplication and division.

To **square** a number is to multiply a number by itself.
e.g. The square of 5 is $5 \times 5 = 5^2 = 25$

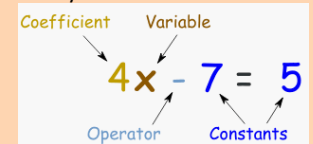
Inverse operations are the opposite operations e.g. the inverse of multiplication is division.

Expressions are made up of terms which may include letters, numbers and operators. e.g. ab^2 , $ab + 5$ and $4d - 5$

Variable is a quantity that can take on a range of values, often denoted by a letter, x , y etc

Coefficient is the number in front of a variable.

Constant is a number or quantity that does not vary.



4) Algebraic Notation 2

Commutative means a calculation can be done in any order to give the same result.
e.g. $5 \times 4 = 4 \times 5$ $6 + 3 = 3 + 6$

Substitution is where we replace a letter with a value.

Evaluate means to calculate the value of.
e.g. if $y = 7$ evaluate $5y$. Answer $5 \times 7 = 35$

Brackets are used in pairs to group things together
e.g. $2(x + 1)$ is two lots of $x + 1$

An **equation** states that two things are equal. It contains expressions on both sides of an equals sign. e.g. $5 = 2x + 1$

Consecutive numbers are numbers which follow in order without gaps. e.g. 12, 13, 14...

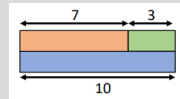
Linear functions result in a straight line graph

5) Equality and Equivalence 1

Equality means having the same value.
e.g. 1 minute = 60 seconds

Fact families are a group of mathematical facts using the same numbers.

e.g.

$$\begin{aligned} 7 + 3 &= 10 \\ 10 &= 3 + 7 \\ 7 &= 10 - 3 \\ 10 - 7 &= 3 \end{aligned}$$


An **unknown** is another word for a **variable**, it is a value we don't know yet. The **unknown** has one distinct value.

When we **solve** an equation we find the value of the unknown. e.g. solve $x + 5 = 8$ answer $x = 3$
In the above example, 3 is the **solution** (answer).

We solve equations by using **inverse** operations.

A **product** is the result of the **multiplication** of two or more values. E.g. the product of 4 and y is $4y$

6) Equality and Equivalence 2

Terms in algebra are single numbers, variables or product of several numbers and variables.

Like terms contain the same variable. e.g. $4a$ and $-2a$ or 8 and 13 or $9m^2$ and $3m^2$

Unlike terms do not contain the same variable. e.g. $4y$ and $3x$ are unlike terms.

Equivalent \equiv means of equal value.
e.g. $2x + 3x \equiv 5x$ is true for all values of x

We can **simplify** an expression by **collecting** like terms.
e.g. $7a + 5b - 2a + b \equiv 5a + 6b$

A mathematical **convention** is an agreed way of doing something in maths. e.g. we write $3 \times y$ as $3y$ not $y3$

One step equations have only one operation.
e.g. $3x = 15$ $6 = y - 2$