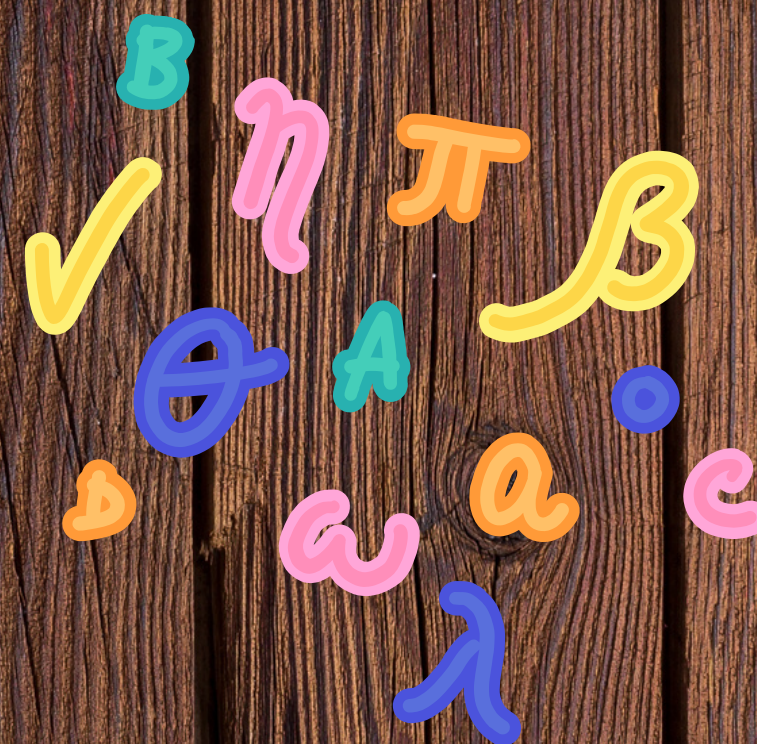




introduction to ALGEBRA

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What is algebra?

Algebra is a study of mathematical symbols and the rules of manipulating them. It includes everything from elementary equation solving to the study of abstractions such as groups, rings and fields.

In other words..

Algebra is a **puzzle** – we start with a specific mathematical operation, and end up with a simpler equation.

For example:

$$x - 6 = 4$$

WHICH MEANS THAT

$$x = 10$$

In algebra, we use something called the 'unknowns' – these are the unknown information, and we write them in the form of letters. It doesn't have to be x or y, it could be any other letter you like.

How to solve the equation?

- Work out how to remove the 'x'
- Remove the unknown by doing the opposite (for example, adding is the opposite of subtracting)

For example:

$$x + 5 = 12 \text{ SO } x = 7 \text{ BECAUSE } 12 - 5 = 7$$

The basic laws of algebra

The basic laws of algebra are the associative, commutative and distributive laws. They help explain the relationship between number operations and lend towards simplifying equations or solving them.

For example:

- Commutative law for addition: $a + b = b + a$
- Commutative law for multiplication: $a * b = b * a$
- Associative law for addition: $(a + b) + c = a + (b + c)$
- Associative law for multiplication: $(a * b) * c = a * (b * c)$
- Distributive law: $a(b + c) = (a * b) + (a * c)$

Parts of an equation

Coefficient

Constants

$$4x - 7 = 5$$

Variable

Operator

A **variable** is a symbol for a number we don't know yet.

A **constant** is a number on its own.

A **coefficient** is a number used to multiply a variable.

Variables on their own usually have a coefficient of 1 ($x = 1x$)

Parts of an equation

Expression

$$\underline{4x} - \underline{7} = \underline{5}$$

An **expression** is a group of terms (they are separated by + or – signs).
The underlined terms are either single numbers or variables, or numbers and variables multiplied together.

Parts of an equation

Exponents make it a lot easier to write and use many multiplications.

Base

4²

Exponent (index)

For example:

$$8^2 = 8 * 8 = 64$$

$$y^3 = y * y * y$$

$$y^2z = y * y * z$$

Sources of information:

- mathsisfun.com/algebra/index.html
- en.wikiversity.org/wiki/Basic_Laws_of_Algebra

