

Directed numbers

$++ \rightarrow +$
 $-- \rightarrow +$
 $+- \rightarrow -$
 $-+ \rightarrow -$

eg $a = -5$ and $b = 2$
 $a^2 = a \times a = -5 \times -5 = 25$
 $b + a = 2 + -5 = -3$

Sequences from algebraic rules

$3n + 7$ This will be linear - note the single power of n . The values increase at a constant rate.
 $3n^2 + 7$ This is not linear as there is a power for n .
 Substitute the number of the term you are looking for in place of ' n '.
 eg
 1st term = $2(1) - 5 = -3$
 2nd term = $2(2) - 5 = -1$
 100th term = $2(100) - 5 = 195$
Checking for a term in a sequence Form an equation
 Is 201 in the sequence $3n - 4$?
 Algebraic rule: $3n - 4 = 201$ Term to check
 Solving this will find the position of the term in the sequence. ONLY an integer solution can be in the sequence.

Addition/ Subtraction with indices

Coefficient Power
 $5x^2 + 4x^4$
 Term Term
 Expression
 Each square represents x^2 and each cube represents x^4 .
 Only similar terms can be simplified. If they have different powers, they are unlike terms.
 $5x^2 + 2x^2 \rightarrow 7x^2$
 $5x^2 + 6x^4 - 3x^2 + x^4 \rightarrow 2x^2 + 7x^4$

Simple Inequalities

$<$ less than
 $>$ More than
 \leq Less than or equal to
 \geq More than or equal to

$x < 10$
 Say this out loud
 "x is a value less than 10"

$10 > x$
 Say this out loud
 "10 is more than the value"

Note:
 $x < 10$ and $10 > x$
 represent the same values

$x + 2 \leq 20$
 "my value + 2 is less than or equal to 20"
 $x \leq 18$
 The biggest the value can be is 18

Multiply expressions with indices

$4b \times 3a$
 $\equiv 4 \times b \times 3 \times a$
 $\equiv 4 \times 3 \times b \times a$
 $\equiv 12ab$
 $5t \times 9t$
 $\equiv 5 \times t \times 9 \times t$
 $\equiv 5 \times 9 \times t \times t$
 $\equiv 45t^2$
 $2b^4 \times 3b^2$
 $\equiv 2 \times b \times b \times b \times b \times 3 \times b \times b$
 $\equiv 2 \times 3 \times b \times b \times b \times b \times b \times b$
 $\equiv 6b^6$
 There are often misconceptions with this calculation but break down the powers

Linear and Non Linear Sequences

Linear Sequences - increase by addition or subtraction and the same amount each time.
 Non-linear Sequences - do not increase by a constant amount - quadratic, geometric and Fibonacci.

- Do not plot as straight lines when modelled graphically.
- The differences between terms can be found by addition, subtraction, multiplication or division.

Fibonacci Sequence - look out for this type of sequence

0 1 1 2 3 5 8 ...
 Each term is the sum of the previous two terms.

Form expressions

For unknown variables, a letter is normally used in its place

More than - ADD

Less than/ difference - SUBTRACT

eg 4 more than $t \rightarrow t + 4$
 8 less than $k \rightarrow k - 8$

Only similar terms can be grouped together

eg Find the perimeter of this shape
 (Perimeter = length around outside of shape)
 $2t + 1$ $t + 2t + 1 + t + 2t + 1 \rightarrow 6t + 2$

Finding the algebraic rule

This is the 4 times table $\rightarrow 4, 8, 12, 16, 20, \dots$
 $4n$
 $7, 11, 15, 19, 22$
 This has the same constant difference - but is 3 more than the original sequence.
 $4n + 3$

$4n + 3$
 This is the constant difference between the terms in the sequence.
 This is the comparison (difference) between the original and new sequence.

Mathematical Language:

Arithmetic

Base

Coefficient

Coefficient

Difference

Exponent

Geometric

Highest Common Factor (HCF)

Indices

Inequality

Linear

Multiply

Non-linear

Position

Power

Product

Product

Sequence

Simplify

Substitute

Term

MATHS IS EVERYWHERE