My mathematical journey

What do I need to remember from before?

Area models for multiplication (NP3)

Collecting like terms (A2)

What will I learn about in this unit?

Expanding expressions with brackets

Factorising expressions as the opposite of expanding

Expanding two brackets

Where does this lead?

Solving equations (A4)

Formulae (A5)

Inequalities (A8)

Quadratic expressions (A11)

Key words and symbols: what I need to say and write accurately

Word	Explanation
variable	a number that can change its value, represented by a letter such as x or a green tile
constant	a number that does not change, is fixed
operation	something that takes input numbers and turns them into output numbers, such as addition (including subtraction), multiplication (including division), exponentiation (including roots)
expression	a collection of constants, variables and operations e.g. $4x$, $2p - 5$ and $x^2 + 3x + 6$ are all expressions
term	the parts of an expression separated by $+$ or $-$. e.g. in the expression $4x - \frac{1}{2}y$, the terms are $4x$ and $\frac{1}{2}y$
expand	write an expression containing brackets *without* the brackets, by multiplying e.g. $2(x - 5) = 2x - 10$
factorise	write an expression without brackets as a multiplication *with* brackets e.g. $2x - 10 = 2(x - 5)$

My mathematical journey

What do I need to remember from before?

Equality & inverse operations (NP2, NP3, NP4)

Solving equations (A1)

Simplifying expressions (A2)

Expanding brackets (A3)

What will I learn about in this unit?

Mathematical equality

Balancing an equation

Solving all types of linear equations

Where does this lead?

Rearranging formulae (A5)

Equations of a line (A6)

Quadratic equations (A12)

Using equations to solve geometry and probability problems (GM2 – GM11, SP7)

Key words and symbols: what I need to say and write accurately

Word	Explanation
unknown	a number that we do not know, represented by a letter
expression	a collection of constants, variables and operations e.g. $4x$, $2p - 5$ and $x^2 + 3x + 6$ are all expressions
equation	when we write two expressions equal to one another e.g. $2 + 3 = 5$, $2x + 3 = 5$ and $2x + 3 = 5x - 6$ are all equations
term	the parts of an expression separated by $+$ or $-$ e.g. in the expression $4x - \frac{1}{2}y$, the terms are $4x$ and $\frac{1}{2}y$
solve	when we solve an equation, we find out what the value of the unknown is

Fingertip facts: what I need to learn by heart

An equation must always be balanced: whatever we do to one side we must also do to the other.

My mathematical journey

What do I need to remember from before?

Arithmetic strategies (NP1, 2, 3, 4)

Order of operations (NP5)

Negative numbers (NP6)

Algebraic expressions (A1, 2, 3)

Solving equations (A4)

What will I learn about in this unit?

Substituting numbers into expressions and formulae

Writing and using formulae

Rearranging formulae to change the subject

Where does this lead?

All further algebra units

Using formulae in geometry (GM3 onwards)

Advanced proportion (NP13)

Advanced probability and statistics (A Level)

Key words and symbols: what I need to say and write accurately

Word	Explanation
variable	A letter that represents many numbers (a letter whose value can vary) e.g. x, y, θ
constant	A fixed number e.g. 2, -1.8, π
expression	A collection of any variables, constants and operations e.g. $2x + 5$, $a - b$, $3p$, $\frac{n+5}{7}$, $3 \times 4 - 2^3$
substitute	Replace a variable with a constant e.g. When $x = 3$, the value of $2x - 1$ is $2 \times 3 - 1$, or 5.
evaluate	Work out the value of a calculation. e.g. "Evaluate 2 + 3" means "Work out the value of 2 + 3."
formula (pl. formulae or formulas)	A set of instructions to work something out. A formula can be written in words, as an expression or as an equation. Here is a formula in words: Area = length × width Here is the formula as an expression: lw Here is the formula as an equation: $A = lw$
subject	The subject of a formula is the variable that is 'on its own' on one side of the equation. e.g. In the formula $A = lw$, the subject is A.
rearrange	Rearranging a formula means changing its subject. e.g. $A = lw$ can be rearranged to make l the subject: $l = \frac{A}{w}$

My mathematical journey

What do I need to remember from before?

Number lines (NP1, 2, 3, and 6)

Substitution (A1 and A5)

Writing expressions, equations and formulae (A2, A3, A4 and A5)

What will I learn about in this unit?

Plotting and using coordinates

The links between graphical and algebraic representations of equations

Gradient as a measure of steepness

Where does this lead?

Sequences (A7)

Inequalities on graphs (A8, A10)

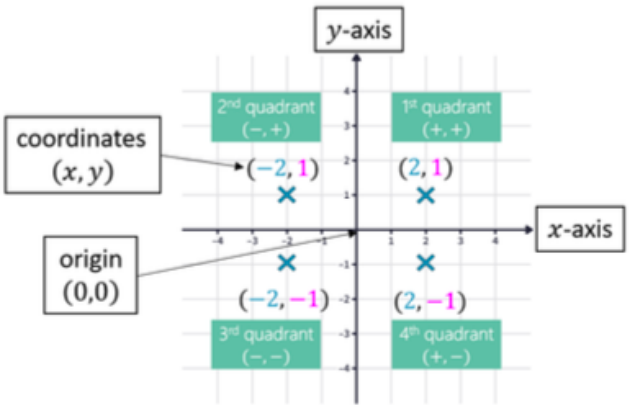
Advanced equations of lines (A10)

Quadratic graphs (A12)

Advanced graphs (A14, A15)

Key words and symbols: what I need to say and write accurately

Word	Explanation
midpoint	the point exactly in the middle of two others
gradient	the steepness of a line
y-intercept	where a graph crosses the y-axis
x-intercept	where a graph crosses the x-axis
parallel	describing two lines that have the same gradient so will never intersect
to intersect	to cross – we say two lines intersect
simultaneously	at the same time
parabola	the name of the shape of a quadratic graph
vertex	the turning point of a quadratic graph



Fingertip facts: what I need to learn by heart

The equation of any straight line can be written in the form $y = mx + c$.

The coefficient of x gives the gradient

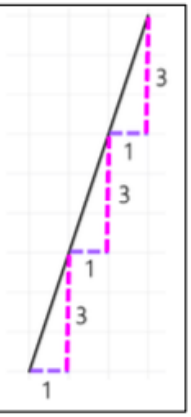
$$y = mx + c$$

The constant gives the y intercept

The steepness of a line is its gradient.

The value of the gradient is the number of units moved vertically for every unit moved horizontally.
In other words: 1 right, ____ up/down.

This line goes 1 right, 3 up, so its gradient is 3.



My mathematical journey

What do I need to remember from before?

Arithmetic (NP2, NP3, NP4)

Solving linear equations (A4)

Formulae, including substitution (A5)

Linear graphs (A6)

What will I learn about in this unit?

Linear sequences

nth term formulae for linear sequences

Recognising non-linear sequences

Where does this lead?

Advanced linear graphs (A10)

Advanced sequences – quadratic and geometric (A13)

Recurrence relations (A13)

Exponential functions (A15)

Sequences on A-Level maths

Key words and symbols: what I need to say and write accurately

Word	Explanation
term	A number in a sequence. Terms have position 1, 2, 3, 4, and so on, and these positions are labelled with the variable n. e.g. in the sequence 5, 7, 9, 11, … the 1st term (where $n = 1$) is 5 and the 4th term (where $n = 4$) is 11.
term-to-term rule	We can define a sequence with a term-to-term rule, which tells us where to start and how to get from one term to the next. e.g. in the sequence 5, 7, 9, 11, … the term-to-term rule would be 'start at 5 and add 2 every time'
increasing sequence	A sequence where each term is greater than the one before. e.g. 5, 7, 9, 11, …
decreasing sequence	A sequence where each term is less than the one before. e.g. 11, 9, 7, 5, …
nth term formula	A formula that calculates the value of each term, using its position, n. For this reason it is sometimes called the position-to-term formula. e.g. For the sequence 5, 7, 9, 11, … the nth term formula is $2n + 3$
coefficient	A number/letter that multiplies another in an expression. e.g. In the expression $2n + 3$, the coefficient of n is 2 and the coefficient of 2 is n.
linear sequence	A sequence where the difference between terms is constant (doesn't change). e.g. 5, 7, 9, 11, … (the difference is 2) or 10, 7, 4, 1, … (the difference is -3).
quadratic sequence	A sequence where the differences between terms form a linear sequence. e.g. 1, 4, 9, 16, 25, … (the differences are 3, 5, 7, 9, …, which is itself a linear sequence).
geometric sequence	A sequence where there is a constant multiplier between terms. e.g. 1, 2, 4, 8, 16, … (each term is multiplied by 2 to get the next)
Fibonacci-style sequence	A sequence where each term is the sum of the previous two. e.g. 1, 4, 5, 9, 14, 23, …

Fingertip facts: what I need to learn by heart

The sequence of square numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, …

The sequence of cube numbers: 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000, …

The triangular (or triangle) numbers: 1, 3, 6, 10, 15, 21, 28, 36, 45, 55, …

The Fibonacci sequence: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, …

My mathematical journey

What do I need to remember from before?

Inequality symbols, < and > (KS2)

Solving linear equations (A4)

Plotting vertical and horizontal graphs (A6)

What will I learn about in this unit?

Reading, writing and interpreting inequalities

Solving linear inequalities, including in contexts

Plotting simple inequalities in 2D

Where does this lead?

Inequalities in 2D (A??)

Quadratic inequalities (A??)

Non-linear inequalities (A Level Maths)

Linear programming (A Level Further Maths)

Key words and symbols: what I need to say and write accurately

Word or symbol	Explanation
>	is greater than
<	is less than
≥	is greater than or equal to
≤	is less than or equal to
equation	a statement that two quantities have equal value, e.g. 5 + 2 = 10 − 3
Inequality	a statement that two quantities do not have equal value, e.g. 5 + 2 < 12 + 1
comparative inequality	an inequality that compares two values, e.g. 4 > 1 or $x > 8$ or $1 \leq x$
restrictive inequality	a 'double' inequality that puts an upper and lower limit on a number, e.g. $5 \leq x < 10$

Phrases meaning 'less than'

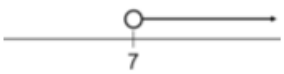
$x < 7$

any number which is...

less than 7
up to (but not including) 7
up to (and excluding) 7

Phrases meaning 'greater than'

$x > 7$

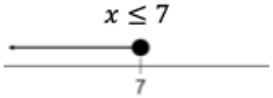


any number which is...

greater than 7
exceeding 7

Phrases meaning 'less than or equal to'

$x \leq 7$

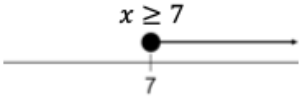


any number which is...

less than or equal to 7
at most 7
no greater/more than 7
up to (and including) 7

Phrases meaning 'greater than or equal to'

$x \geq 7$



any number which is...

greater than or equal to 7
at least 7
no less than 7

Fingertip facts: what I need to learn by heart

Inequalities can be read in both directions.
These two statements mean the same thing.

$5 > 3$ $\qquad$ $3 < 5$

read this way: *5 is greater than 3* $\qquad$ read this way: *5 is greater than 3*

read this way: *3 is less than 5* $\qquad$ read this way: *3 is less than 5*

If we multiply or divide an inequality by a negative number, the direction of the sign reverses due to the rotating effect of multiplication by negatives.

If $-x > 2$,
then $x < -2$