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)

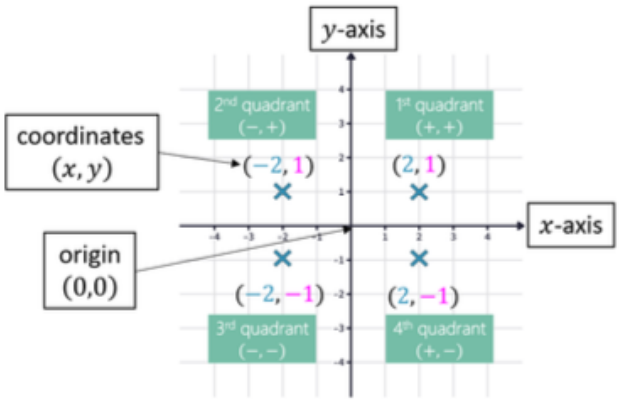
Advanced equations of lines (A10)

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

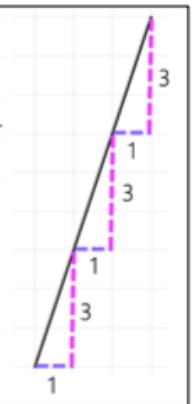
$$y = mx + c$$

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)

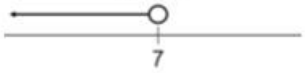
Linear programming (A Level Further Maths)

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...

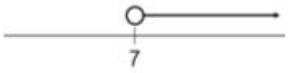
less than 7

up to (but not including) 7

up to (and excluding) 7

Phrases meaning 'greater than'

$x > 7$



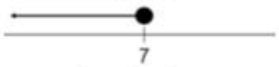
any number which is...

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

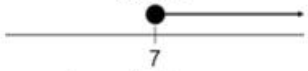
at most 7

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 $x < -2$