### My mathematical journey

# What do I need to remember from before?

Adding and subtracting expressions (A2)

Multiplying and dividing expressions (A3)

Factorising expressions (A3)

Simplifying fractions (NP7)

Rearranging formulae (A5)

# What will I learn about in this unit?

Rules of indices: multiplication, division and exponentiation

Multiplying multiple brackets

Factorising quadratics

Simplifying algebraic fractions

Rearranging more complex formulae

#### Where does this lead?

Quadratic graphs and equations (A12, A14)

Working with all types of nonlinear functions (A15)

Operating with algebraic fractions (A17)

Algebraic proof by deduction (A17)

A-Level mathematics

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

Word	Explanation		
polynomial	an expression containing only numbers and non-negative powers of $x$ .		
	e.g. $12x + 7$ , $12 + 56x - x^2$ , $12 + 56x - x^2 + 11x^3$ .		
binomial	an expression with two terms. e.g. $x - 1$ , $5x + 6$ , $12x^2 + 7x$ .		
	"is identical to". Used to show an identity – when two expressions are identical for every value of		
=	x, perhaps just written in a different way.		
	e.g. $x^2 + 5x + 6 \equiv (x+3)(x+2)$ or $5x - 3x \equiv 2x$		

Types of polynomial	General expanded form	Example (expanded and factorised)
Constant, $x^0$ , no brackets	а	5
Linear, $x^1$ , up to one bracket	ax + b	$4x + 10 \equiv 2(2x + 5)$
Quadratic, $x^2$ , up to two brackets	$ax^2 + bx + c$	$2x^2 + 7x + 3 \equiv (2x + 1)(x + 3)$
Cubic, $x^3$ , up to three brackets	$ax^3 + bx^2 + cx + d$	$x^3 + 3x^2 - 6x - 8 \equiv (x+1)(x-2)(x+4)$

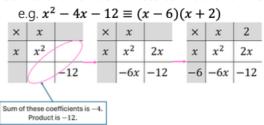
## Fingertip facts: what I need to learn by heart

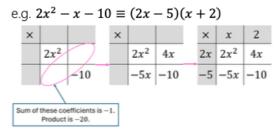
#### The index laws

- 1. When we multiply powers with the same base, we can add their exponents.  $x^7 \cdot x^3 = x^{10}$
- 2. When we <u>divide</u> powers with the <u>same base</u>, we can <u>subtract their exponents</u>.  $\frac{x^7}{x^3} = x^4$
- 3. When we find a power of a power, we can multiply the exponents together.  $(x^2)^3 = x^6$

# Factorising a quadratic, $ax^2 + bx + c$

Look for two numbers whose sum is b and whose product is ac.





Difference of two squares e.g.  $x^2 - 9 \equiv (x - 3)(x + 3)$  or  $16x^2 - 49 \equiv (4x - 7)(4x + 7)$