Year 7 – Unit 3 - Manipulating Expressions – Knowledge Organiser

Objective
Know and use the vocabulary and notation associated with algebraic manipulation
Simplify algebraic expressions by collecting like terms
Work with brackets in algebraic expressions
Interpret expressions as functions with inputs and outputs
Substitute numerical values into formulae and expressions

Key Facts

a × b is written as ab
y + y + y can be written as 3 × y or 3y
a × a can be simplified to a^2
a × a × a can be simplified to a^3
a ÷ b is written as $\frac{a}{b}$
y and y^2 are not like terms

Substitution
If a = 4 and b = 7 then:
2ab = 2 × a × b = 2 x 4 x 7 = 56

2a + 3b = 2 × a + 3 × b
= 2 × 4 + 3 × 7 = 8 + 21 = 29

Simplifying expressions
(adding/subtracting)

e.g. $2a + 3b - a + 4b = a + 7b$

$2a - a = a$ $\quad + 3b + 4b = +7b$

(multiplying)

e.g. $5p \times 3q = 15pq$

Expanding brackets

e.g. $3(5a - 2) = (3 \times 5a) - (3 \times 2)$

$= 15a - 6$

Key Concept Check

- Jenny writes 2a + 3b + 5a – b = 7a + 3. Kenny writes 2a + 3b + 5a – b = 9ab. What would you write? Why?
- Always/Sometimes/Never: a^2 = 2a, ab = ba,
- If a = 2 then 5a = 52. Comment on this.

Key words used in this unit:

Simplify – gather all like terms or multiply/divide expressions.

Expand – multiply out each term in a bracket

Coefficient – this is the number in front of a term e.g. 5x, 5 is the coefficient.

Variable – a quantity that can take on a range of values, shown by a letter

Expression – mathematical phrase that can contain ordinary numbers, variables (like x or y) and operators (like +, -, x, and ÷) but has no equals sign e.g. 5y + 7

Equation – mathematical statement that contains an equals sign e.g. 5x + 2 = 7

Formula – an equation that links sets of physical variables e.g. A = ½bh is the formula for the area of a triangle

Substitution – replacing letters for numbers