AQA GCSE Mathematics – Algebra

By: Josh Hodson

Subject: Mathematics

Grade: KS4

Detailed revision guide for the Algebra topic in AQA GCSE Mathematics covering definitions, examples, methods, advantages, disadvantages, and practice questions.

Algebra – AQA GCSE Mathematics (8300)

Key Concepts

- Expressions, equations, inequalities
- Substitution and formulae
- Sequences (arithmetic and geometric)
- Graphs of functions and lines
- Factorising and expanding brackets
- Solving linear and quadratic equations
- Simultaneous equations

Definitions & Examples

- Expression: A combination of numbers, variables and operators, e.g., $2x + 5$.
- Equation: A statement that two expressions are equal, e.g., $3x + 2 = 11$.
- Inequality: Shows that one side is greater or less than the other, e.g., $x + 5 > 7$.
- Sequence: Ordered list of numbers following a pattern, e.g., 2, 5, 8, 11 (arithmetic +3).
- Function: A rule that assigns each input exactly one output, e.g., $f(x) = 2x + 1$.

Methods

- Substitute values into formulae to calculate unknowns
- Expand and simplify brackets
- Factorise expressions to solve equations
- Use graphical methods to solve linear and quadratic equations
- Solve simultaneous equations by substitution or elimination
- Generate and continue sequences

Advantages & Disadvantages

- Advantages: Develops reasoning, problem solving, transferable to science/CS,

allows generalisation of patterns.
- Disadvantages: Can be abstract, requires careful manipulation to avoid errors, quadratic factorisation can be tricky.

Practice Questions

- Simplify: 3(x + 2) + 5x
- Solve: 2x + 7 = 15
- Factorise: x^2 + 5x + 6
- Solve simultaneous equations: x + y = 10, 2x - y = 3
- Find the 10th term of the sequence 4, 7, 10, 13,...
- Sketch the graph of y = 2x + 1