

Summary of learning goals

- Students come to appreciate the power of algebra for generalising results from arithmetic. They connect arithmetic operations with algebraic notation and visualisations. Each lesson commences with an observation made using arithmetic that students then justify and extend using algebra.

Australian Curriculum: Mathematics (Year 9)

ACMNA213: Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate.

Summary of lessons

Who is this sequence for?

- This set of lessons is designed to consolidate skills in algebra, including collecting like terms and expanding and factorising using the distributive law. The resources emphasise the importance of algebra for generalising and justifying arithmetic results. It is assumed that students have some familiarity with algebraic notation.

Lesson 1: Think of a Number (THOAN) – Linear Equations

Lesson 2: Think of a Number (THOAN) – Binomial Equations

- Think of a number (THOAN) activities show how algebraic reasoning can be used to explain and formulate problems in which chains of operations always result in the same outcome regardless of the number chosen. Students are introduced to THOANs involving simple linear operations, and use algebraic simplification to explain why the THOAN works. They are then asked to complete a THOAN when given some starting operations and, finally, to make and test their own.
- In Lesson 1 students work with THOANs using linear equations. Lesson 2 uses binomial equations. The two lessons are otherwise identical.

Reflection on this sequence

Rationale

Approaching algebra as generalised arithmetic shows students the power of algebra for abstracting number. This focus on algebra as generalised arithmetic is typically under-represented in secondary mathematics in favour of more time spent on functions and equations.



reSolve mathematics is purposeful

- This sequence supports a rich interpretation and enactment of the Australian Curriculum: Mathematics, providing fun and engaging ways to understand the algebraic content of the Curriculum. The lessons explore mathematics as a creative and imaginative endeavour, emphasising the entertaining applications of mathematics and the understanding of the mathematical foundation beneath common ‘tricks’ that students are likely to have encountered before.



reSolve tasks are inclusive and challenging

- The tasks in this sequence activate existing knowledge, develop new knowledge and explore relationships between key ideas in the Australian Curriculum. The lessons allow students to determine the complexity of their problems themselves, which allows for a low floor and a high ceiling.



reSolve classrooms have a knowledge-building culture

- Each task in this sequence begins by inspiring curiosity and intrigue through a shared classroom experience that promotes higher-order thinking through the role of both teacher and student. Students build understanding through collaborative inquiry, action and reflection. The sequence encourages students to challenge their existing conceptions and to use their mistakes as a vehicle for further learning.