

Summary of learning goals

- Students explore open tasks that have various solutions or strategies, which focus on developing core algebraic skills while enriching their experiences with using algebra. Students benefit from tackling tasks they do not already know how to do. Through comparing and contrasting ideas and experiences, students develop networks of concepts for themselves.

Australian Curriculum: Mathematics (Year 8)

ACMNA190: Extend and apply the distributive law to the expansion of algebraic expressions.

- Applying the distributive law to the expansion of algebraic expressions using strategies such as the area model.

ACMNA191: Factorise algebraic expressions by identifying numerical factors.

- Recognising the relationship between factorising and expanding.
- Identifying the greatest common divisor (highest common factor) of numeric and algebraic expressions and using a range of strategies to factorise algebraic expressions.

ACMNA192: Simplify algebraic expressions involving the four operations.

- Understanding that the laws used with numbers can also be used with algebra.

Summary of lessons

Who is this sequence for?

- These lessons consist of stand-alone activities that provide consolidation of algebra skills and optional extension. At a minimum, students should understand the meaning of simple algebraic expressions such as $5a + 1$, $5ab$ and $2(5a + 1)$; be able to combine terms to create new expressions; and be able to substitute values. They need to understand that some 'equations' are true for just a few values of the unknown(s), and others (the identities) are true for all values. Students who have more algebraic skills will be able to create more advanced solutions.

Lesson 1: Like Terms

This resource contains a collection of tasks focusing on like terms. In the task How Can You Make It?, students create a given expression using a range of provided terms and then share their strategies. In the task Algebra Card Set, students place mathematical operation arrows between expressions to show the relationship between those expressions. In the task Composite Areas, students determine the area of various composite shapes made of squares and quadrants, in terms of given areas.

Lesson 2: Substitution

This resource contains a collection of tasks focusing on substitution. In the task *Expressing Relationships*, students determine a range of values that make a two-variable equation true. In the task *What Can It Be?*, students work with an incomplete identity and explore options that will make the identity true. In the task *Temperature Conversion*, students find values that satisfy the relationship between temperatures expressed in degrees Fahrenheit and temperatures expressed in degrees Celsius.

Reflection on this sequence

Rationale

This resource consists of a series of open-ended tasks, discussion starters and mathematically interesting challenges. The tasks are not intended to be used sequentially; it is recommended that they be interspersed with regular algebra teaching and learning. Most tasks can be easily adapted to use algebraic expressions of varying complexity, and so the lessons provide teachers with some templates to create tasks for practising other skills.



reSolve mathematics is purposeful

- Fluency is addressed through the variety of tasks that are encountered so that practice is not mechanical. In many tasks, students can set their own level of challenge for practice of algebraic skills.
- Reasoning is developed as students justify their solution strategies.



reSolve tasks are challenging yet accessible

- All tasks are provided with enabling and extending prompts. Most have a simple way to start and allow students choice in the complexity of the algebra they employ.



reSolve classrooms have a knowledge-building culture

- The tasks are conducted either in small groups or consolidated through active participation in small and large groups. Various strategies for eliciting group discussion are included throughout this resource.

Acknowledgements

Many of the tasks within this sequence were developed as a result of inspiration from the following:

- Mathematics Task Centre (specifically Task: *Algebra Through Geometry*)
- Mason J, Pimm D, Graham A *et al.*, 1985, *Routes to/Roots of Algebra*, Centre for Mathematics Education: The Open University Press. (Australian adaptation by B. Henry, 1987)