

Achievement Standard

Subject Reference Mathematics and Statistics 1.2

Title Apply algebraic procedures in solving problems

Level 1 **Credits** 4 **Assessment** External

Subfield Mathematics

Domain Algebra

Status Registered **Status date** 9 December 2010

Planned review date 31 December 2014 **Date version published** 9 December 2010

This achievement standard involves applying algebraic procedures in solving problems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Apply algebraic procedures in solving problems. 	<ul style="list-style-type: none"> Apply algebraic procedures, using relational thinking, in solving problems. 	<ul style="list-style-type: none"> Apply algebraic procedures, using extended abstract thinking, in solving problems.

Explanatory Notes

- This achievement standard is derived from Level 6 of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, and is related to the material in the *Teaching and Learning Guide for Mathematics and Statistics*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>. The following achievement objectives taken from the Equations and Expressions, and Patterns and Relationships threads of the Mathematics and Statistics learning area are related to this standard:
 - generalise the properties of operations with fractional numbers and integers
 - generalise the properties of operations with rational numbers including the properties of exponents
 - form and solve linear equations and inequations, quadratic and simple exponential equations, and simultaneous equations with two unknowns.
- Apply algebraic procedures* involves:
 - selecting and using a range of procedures in solving problems
 - demonstrating knowledge of algebraic concepts and terms
 - communicating solutions using appropriate mathematical symbols.

Relational thinking involves one or more of:

- selecting and carrying out a logical sequence of steps
- connecting different concepts and representations
- demonstrating understanding of concepts
- forming and using a model;

and also relating findings to a context, or communicating thinking using appropriate mathematical statements.

Extended abstract thinking involves one or more of:

- devising a strategy to investigate or solve a problem
- identifying relevant concepts in context
- developing a chain of logical reasoning, or proof
- forming a generalisation;

and also using correct mathematical statements, or communicating mathematical insight.

- 3 *Problems* are situations that provide opportunities to apply knowledge or understanding of mathematical concepts and procedures and methods. The situation will be set in a real-life or mathematical context.
- 4 The phrase 'a range of procedures' indicates that evidence of the application of at least three different procedures is required.
- 5 Students need to be familiar with procedures related to:
- factorising
 - expanding
 - simplifying algebraic expressions involving exponents, such as $(2x^4)^3$ or $\frac{12a^5}{8a^7}$
 - substituting values into formulae
 - manipulating and simplifying expressions such as $\frac{3x}{4} - \frac{x+2}{3}$ or $\frac{3x^2-12}{x-2}$
 - rearranging formulae such as $E = \frac{1}{2}mv^2$ or $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$
 - solving linear equations or inequations such as $5x + 12 = 3 - 2x$ or $3(x - 2) < 7$
 - solving quadratic equations such as $(8x + 3)(x - 6) = 0$, $x^2 + 5x - 6 = 0$, $3x^2 = 10x - 8$ (completing the square and the quadratic formula are not required)
 - solving simple equations involving exponents such as $x^3 = 8$, $5^x = 125$
 - solving pairs of simultaneous linear equations with two unknowns.
- 6 Electronic technology is not permitted in the assessment of this achievement standard.
- 7 Assessment Specifications for this achievement standard can be accessed through the Mathematics and Statistics Resources page found at <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/ncea-subject-resources/>.

Replacement Information

This achievement standard replaced unit standard 5239.

Quality Assurance

- 1 Providers and Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference

0233