

Achievement Standard

Subject Reference Mathematics and Statistics 2.6

Title Apply algebraic methods in solving problems

Level 2 **Credits** 4 **Assessment** External

Subfield Mathematics

Domain Algebra

Status Registered **Status date** 19 November 2015

Planned review date 31 December 2018 **Date version published** 19 November 2015

This achievement standard involves applying algebraic methods in solving problems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Apply algebraic methods in solving problems.	Apply algebraic methods, using relational thinking, in solving problems.	Apply algebraic methods, using extended abstract thinking, in solving problems.

Explanatory Notes

- This achievement standard is derived from Level 7 of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the achievement objectives
 - manipulate rational, exponential, and logarithmic algebraic expressions
 - form and use linear and quadratic equations
 in the Mathematics strand of the Mathematics and Statistics Learning Area. It is also related to the material in the *Teaching and Learning Guide for Mathematics and Statistics*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of the *Marautanga* achievement objectives to which this standard relates, see the [Māori version](#) of the standard.

- Apply algebraic methods in solving problems* involves:
 - selecting and using methods
 - demonstrating knowledge of algebraic concepts and terms
 - communicating using appropriate representations.

Relational thinking involves one or more of:

- selecting and carrying out a logical sequence of steps

- connecting different concepts or 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 methods. Situations will be set in real-life or mathematical contexts.
- 4 Methods include a selection from those related to:
 - manipulating algebraic expressions, including rational expressions
 - manipulating expressions with exponents, including fractional and negative exponents
 - determining the nature of the roots of a quadratic equation
 - solving exponential equations (which may include manipulating logarithms)
 - forming and solving linear and quadratic equations.
- 5 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 and AS91269 replaced AS90284, AS90806, and AS90809, and unit standard 5246.

Quality Assurance

- 1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference

0233

Paerewa Paetae

Aronga Pāngarau 2.6

Ingoa Te whakamahi tikanga taurangi hei whakaoti rapanga

Kaupae 2 **Whiwhinga** 4 **Aromatawai** Ā-waho

Marau akoranga Te Marautanga o Aotearoa

Kokonga akoranga Pāngarau

Mana rēhita Kua rēhitatia **Te rā i mana ai** 19 Whiringa-ā-rangi 2015

Te rā e arotakengia ai 31 Hakihea 2018 **Te rā i puta ai** 19 Whiringa-ā-rangi 2015

Te Hononga ki te Marautanga

I ahu mai tēnei paerewa paetae i te Taumata 7 o *Te Marautanga o Aotearoa*, i whakaputaina e Te Pou Taki Kōrero i te tau 2008.

Whāinga Paetae

Te Taurangi me te Tuanaki, Te Whārite me te Kīanga

6 *Ka rāwekeweke i ngā kīanga taurangi hautanga, taupūtanga, taupūtanga kōaro hoki.*

7 *Ka tuhi, ka whakamahi whārite rārangi, whārite pūrua, whārite pākoki māmā hoki.*

E hono ana ki te Papa Whakaako mō te Pāngarau kei te pae tukutuku nei:

<http://tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa/Taumata-Matauranga-a-Motu-Ka-Taea>.

Te Hononga ki *The New Zealand Curriculum* (NZC)

I ahu mai hoki tēnei paerewa paetae i *The New Zealand Curriculum*. Mō ngā kōrero e pā ana ki ngā whāinga paetae o te NZC e hāngai ana ki tēnei paerewa, tirohia te [putanga reo Pākehā](#) o te paerewa.

Te Hononga ki ngā Paearu Aromatawai

Arā ngā Paearu Aromatawai mō tēnei paerewa paetae, kei te:

<http://tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa/Taumata-Matauranga-a-Motu-Ka-Taea>.

Paerewa Paetae

Paetae Te whakamahi tikanga taurangi hei whakaoti rapanga.	Hei tohu i te paetae: • Ka whiriwhiri, ka whakamahi i ētahi tikanga taurangi whānui hei whakaoti rapanga. • Ka whakaatu mōhiotanga ki ngā huatau taurangi me ngā kupu e hāngai ana hei whakaoti rapanga. • Ka whakamārama i ngā otinga mēnā kotahi, e rua rānei ngā mahi o roto i te tikanga i whakamahia ai.
Kaiaka He kaiaka te whakamahi tikanga taurangi hei whakaoti rapanga.	Hei tohu i te kaiaka: • Ko te whakaaro tūhonohono te mea nui. Arā, kia kotahi, nui ake rānei o ēnei: – ka whiriwhiri, ka whakatutuki raupapatanga mahi arorau hei whakaoti rapanga – ka tūhono i ētahi huatau rerekē, i ētahi whakaahuahanga rerekē rānei hei whakaoti rapanga – ka whakaatu māramatanga ki ngā huatau e hāngai ana – ka hanga, ka whakamahi tauira. • Ka tūhono i ngā otinga ki tētahi horopaki, ka whakamahi rānei i ngā kīanga pāngarau hei whakawhitiwhiti whakaaro.
Kairangi He kairangi te whakamahi tikanga taurangi hei whakaoti rapanga.	Hei tohu i te kairangi: • Ko te whakaaro waitara te mea nui. Arā, kia kotahi, nui ake rānei o ēnei: – ka waihanga rautaki hei tūhura, hei whakaoti rānei i tētahi rapanga – ka tautohu i ngā huatau e hāngai ana ki te horopaki – ka whakaputa i tētahi raupapatanga whakaaro arorau, i tētahi hāponotanga rānei – ka hanga whakawhānuitanga. • Ka whakamahi i ngā kīanga pāngarau tika hei whakawhitiwhiti i te aroā pāngarau.

Kōrero Āpiti

- 1 E whai ake nei ngā whakamārama o ngā tino kupu, kīanga rānei:

rapanga	Ko ngā āhuatanga o ia rā, ngā āhuatanga pāngarau rānei ka whai wāhi mai te whakamahinga o te mātauranga pāngarau, o ngā huatau pāngarau, o ngā tikanga pāngarau rānei.
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- 2 Kia taunga te ākonga ki ngā tikanga o te taurangi:
- te rāwekeweke i ngā kīanga taurangi, i ngā kīanga taurangi hautanga hoki
 - te rāwekeweke i ngā kīanga taurangi taupūtanga, taupūtanga hautanga, taupūtanga tōraro hoki
 - te kimi i te āhua o ngā otinga o te whārite pūrua
 - te whakaoti i ngā kīanga taurangi taupūtanga (he wā ōna e whai wāhi mai ana te rāwekeweke i ngā whārite taupū kōaro)

- te tuhi me te whakaoti i ngā whārite rārangi me ngā whārite pūrua.

Kuputaka:

aroā pāngarau

mathematical insight

kīanga pāngarau

mathematical statement

whakaaro tūhonohono

relational thinking

whakaaro waitara

abstract thinking

He Kōrero mō te Whakakapi

Koinei me te AS91269 hei whakakapi i ngā paerewa paetae AS90284, AS90806 me AS90809, me te paerewa 5246.

Tātari Kounga

- 1 Me mātua whakamana ngā Kaituku Akoranga me ngā Whakahaere Whakangungu Ahumahi e te Mana Tohu Mātauranga o Aotearoa ka rēhita ai i ngā hua ka puta mai i ngā aromatawai ki ngā paerewa paetae.
- 2 Ko ngā Kaituku Akoranga me ngā Whakahaere Whakangungu Ahumahi kua mana, ā, e aromatawai ana i ā rātou hōtaka ki ngā paerewa paetae, me uru rātou ki ngā pūnaha whakaōrite e tika ana mō aua paerewa paetae.

Ko te tohutoro ki te Mahere Whakamana, Whakaōritenga hoki

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