

## Achievement Standard

**Subject Reference** Mathematics and Statistics 1.1

**Title** Apply numeric reasoning in solving problems

**Level** 1      **Credits** 4      **Assessment** Internal

**Subfield** Mathematics

**Domain** Number

**Status** Registered      **Status date** 9 December 2010

**Planned review date** 31 December 2016      **Date version published** 12 December 2013

This achievement standard involves applying numeric reasoning in solving problems.

### Achievement Criteria

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

### Explanatory Notes

- 1 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 Number Strategies and Knowledge thread of the Mathematics and Statistics learning area, are related to this achievement standard:
- reason with linear proportions
  - use prime numbers, common factors and multiples, and powers (including square roots)
  - understand operations on fractions, decimals, percentages, and integers
  - use rates and ratios
  - know commonly used fraction, decimal, and percentage conversions
  - know and apply standard form, significant figures, rounding, and decimal place value
  - apply direct and inverse relationships with linear proportion
  - extend powers to include integers and fractions
  - apply everyday compounding rates.

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.

2 *Apply numeric reasoning* involves:

- selecting and using a range of methods in solving problems
- demonstrating knowledge of number concepts and terms
- communicating solutions which would usually require only one or two steps.

*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 methods. The situation will be set in a real-life or mathematical context.

4 The phrase 'a range of methods' indicates that evidence of the application of at least three different methods is required.

5 Students need to be familiar with methods related to:

- ratio and proportion
- factors, multiples, powers and roots
- integer and fractional powers applied to numbers
- fractions, decimals and percentages
- rates
- rounding with decimal places and significant figures
- standard form.

6 Conditions of Assessment related to this achievement standard can be found at [www.tki.org.nz/e/community/ncea/conditions-assessment.php](http://www.tki.org.nz/e/community/ncea/conditions-assessment.php).

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### Replacement Information

This achievement standard replaced unit standard 5235.

**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 1.1		
Ingoa	Te whakamahi whakaaro tau whaitake hei whakaoti rapanga		
Kaupae	1	Whiwhinga	4
		Aromatawai	Ā-roto
Marau akoranga	Te Marautanga o Aotearoa		
Kokonga akoranga	Pāngarau		
Mana rēhita	Kua rēhitatia	Te rā i mana ai	9 Hakihea 2010
Te rā e arotakengia ai	31 Hakihea 2016	Te rā i puta ai	12 Hakihea 2013

### Te Hononga ki te Marautanga

I ahu mai tēnei paerewa paetae i te Taumata 6 o *Te Marautanga o Aotearoa*, i whakaputaina e Te Pou Taki Kōrero i te tau 2008.

### Whāinga Paetae

*Te Tau me te Taurangi, Te Mātauranga me ngā Rautaki Tau*

- 1 *Ka whakamahi pānga rārangi, pānga rārangi hāngai, pānga rārangi kōaro hoki.*
- 2 *Ka whakawhānui taupū, kia hāngai ki ngā tau tōpū me ngā hautau.*
- 3 *Ka whakamahi pāpātanga whakaputu o ia rā.*
- 4 *Ka whakamahi rautaki tau ki te whiriwhiri otinga tino whaihua.*
- 5 *Ka mārama ki te whaitakenga o te otinga o tētahi rapanga.*

E hono ana ki te Papa Whakaako mō Pāngarau kei te pae ipurangi 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 Tikanga Aromatawai

Kei tēnei pae ipurangi ngā Tikanga Aromatawai mō tēnei paerewa paetae:

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

**Paerewa Paetae**

<p><b>Paetae</b> Te whakamahi whakaaro tau whaitake hei whakaoti rapanga.</p>	<p>Hei tohu i te paetae:</p> <ul style="list-style-type: none"> <li>• ka whiriwhiri, ka whakamahi i ētahi tikanga tau whānui e hāngai ana hei whakaoti rapanga</li> <li>• ka whakaatu mōhiotanga ki ngā huatau me ngā kupu pāngarau e hāngai ana</li> <li>• ka whakamārama i ngā otinga mēnā kotahi, e rua rānei ngā mahi o roto i te tikanga i whakamahia ai.</li> </ul>
<p><b>Kaiaka</b> He kaiaka te whakamahi whakaaro tau whaitake hei whakaoti rapanga.</p>	<p>Hei tohu i te kaiaka:</p> <ul style="list-style-type: none"> <li>• Ko te whakaaro tūhonohono te mea nui. Arā, kia kotahi, nui ake rānei o ēnei: <ul style="list-style-type: none"> <li>– ka whiriwhiri, ka whakatutuki i te raupapatanga mahi arorau hei whakaoti rapanga</li> <li>– ka tūhono i ētahi huatau rerekē, ētahi whakaahuahanga rerekē rānei</li> <li>– ka whakaatu māramatanga ki ngā huatau e hāngai ana</li> <li>– ka hanga, ka whakamahi tauira.</li> </ul> </li> <li>• Ko te tūhono i ngā otinga ki te horopaki o te rapanga, te whakamahi rānei i ngā kīanga pāngarau hei whakawhitiwhiti whakaaro.</li> </ul>
<p><b>Kairangi</b> He kairangi te whakamahi whakaaro tau whaitake hei whakaoti rapanga.</p>	<p>Hei tohu i te kairangi:</p> <ul style="list-style-type: none"> <li>• Ko te whakaaro waitara te mea nui. Arā, kia kotahi, nui ake rānei o ēnei: <ul style="list-style-type: none"> <li>– ka waihanga rautaki hei tūhura, hei whakaoti rānei i tētahi rapanga</li> <li>– ka tautohu i ngā huatau e hāngai ana ki te horopaki</li> <li>– ka whakaputa i tētahi raupapatanga whakaaro arorau, tētahi hāponotanga rānei</li> <li>– ka hanga whakawhānuitanga.</li> </ul> </li> <li>• Ko te whakamahi kīanga pāngarau tika, te whakawhitiwhiti rānei i te aroā pāngarau.</li> </ul>

**Kōrero Āpiti**

1 E whai ake nei ko te whakamāramatanga o ngā kupu whaitake, kīanga rānei:

rapanga	Ko ngā āhuetanga o ia rā, ngā āhuetanga pāngarau rānei, ka whai wāhi mai te whakamahinga o te mātauranga pāngarau, o ngā huatau pāngarau, o ngā tikanga pāngarau rānei.
ētahi tikanga tau whānui	Kia toru, nui ake rānei ngā tikanga.

2 Kia taunga te ākongā ki ngā tikanga e whai wāhi mai ana:

- te ōwehenga me te hautanga

- te tauwehe, te taurea, te taupū me te pūtake
- te taupū tōraro me te taupū hautanga o tētahi tau
- te hautau, te tau ā-ira me te ōrau
- te pāpātanga
- te whakaawhiwhinga, me te tohu anō i te maha o ngā mati ā-ira, te maha rānei o ngā mati whai tikanga
- te tānga ngahuru.

Kuputaka:

whakaaro tau whitake

whakaaro tūhonohono

whakaaro waitara

numeric reasoning

relational thinking

abstract thinking

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### He Kōrero mō te Whakakapi

Koinei hei whakakapi i te paerewa 5235.

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### 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 whakarite e tika ana mō aua paerewa paetae.

Ko te tohutoro ki te Mahere Whakamana, Whakaōritenga hoki

0233