

Achievement Standard

Subject Reference Mathematics and Statistics 1.3

Title Investigate relationships between tables, equations and graphs

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

Subfield Mathematics

Domain Algebra

Status Registered **Status date** 9 December 2010

Planned review date 31 December 2020 **Date version published** 20 November 2014

This achievement standard involves investigating relationships between tables, equations and graphs.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Investigate relationships between tables, equations and graphs. 	<ul style="list-style-type: none"> Investigate relationships between tables, equations and graphs, using relational thinking. 	<ul style="list-style-type: none"> Investigate relationships between tables, equations and graphs, using extended abstract thinking.

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 Patterns and Relationships, Equations and Expressions, and Number Strategies and Knowledge threads of the Mathematics and Statistics learning area are related to this achievement standard:
 - find optimal solutions, using numerical approaches
 - solve linear equations and inequations, quadratic and simple exponential equations, and simultaneous equations with two unknowns
 - relate graphs, tables, and equations to linear, quadratic, and simple exponential relationships found in number and spatial patterns
 - relate rate of change to the gradient of a graph.

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 *Investigate relationships* involves:

- making links between tables, equations and graphs
- demonstrating knowledge of concepts and terms
- communicating using appropriate numeric, symbolic or graphical representations.

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 a situation
- 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 *Relationships* include the connections between matching features of tables, equations and graphs, as well as mappings between variables in a set of ordered pairs (relations).

4 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 AS91029 replaced unit standard 5238.

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.

Paerewa Paetae

Aronga	Pāngarau 1.3		
Ingoa	Te tūhura i ngā hononga o te tūtohi, te whārite me te kauwhata		
Kaupae	1	Whiwhinga	4
		Aromatawai	Ā-waho
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 2020	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
4 *Ka whakamahi rautaki tau ki te whiriwhiri otinga tino whaihua.*

Te Tau me te Taurangi, Te Whārite me te Kīanga
6 *Ka tuhi, ka whakaoti whārite rārangi, tōrite rārangi, whārite pūrua, whārite taupū māmā, whārite tukutahi, kia rua ngā taurangi.*

Te Tau me te Taurangi, Te Pānga me te Tauira
8 *Ka tūhono i te kauwhata, te tūtohi me te whārite ki ngā pānga rārangi, pānga pūrua, pānga taupū māmā e kitea mai ana i ngā tauira tau me ngā tauira mokowā.*
9 *Ka tūhono i te pāpātanga o te whiti ki te rōnaki o tētahi kauwhata.*

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 Paearu Aromatawai

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

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

Paerewa Paetae

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

Kōrero Āpiti

1 E whai ake nei ko te whakamāramatanga o ngā kupu whaitake, 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.
hononga	Ko ngā āhuatanga e hono ana i te tūtohi, te whārite me te kauwhata e whakaatu ana i ētahi taurangi, me te whakaatu anō i ngā taurangi hei takirua raupapa.

Kuputaka:

whakaaro tūhonohono
whakaaro waitara

relational thinking
abstract thinking

He Kōrero mō te Whakakapi

Koinei me te paerewa paetae 91029 hei whakakapi i te paerewa 5238.

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