

Achievement Standard

Subject Reference	Mathematics and Statistics 1.9		
Title	Apply transformation geometry in solving problems		
Level	1	Credits	2
		Assessment	Internal
Subfield	Mathematics		
Domain	Geometry		
Status	Registered	Status date	9 December 2010
Planned review date	31 December 2016	Date version published	12 December 2013

This achievement standard involves applying transformation geometry in solving problems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Apply transformation geometry in solving problems. 	<ul style="list-style-type: none"> Apply transformation geometry, using relational thinking, in solving problems. 	<ul style="list-style-type: none"> Apply transformation geometry, 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 achievement standard is aligned to the following achievement objectives taken from the Transformation thread of the Mathematics and Statistics learning area:
 - define and use transformations and describe invariant properties of figures and objects under these transformations
 - compare and apply single and multiple transformations
 - analyse symmetrical patterns by the transformations used to create them.

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 transformation geometry* involves:
 - selecting and using a range of methods in solving problems
 - demonstrating knowledge of geometrical concepts and terms
 - communicating solutions using geometrical terms or 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 *Problems* are situations which 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:
 - transformations (reflection, rotation, translation, and enlargement)
 - symmetry of shapes and patterns.
- 6 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.

Replacement Information

This achievement standard and AS90133 replaced unit standard 5231, unit standard 5237, and AS90150.

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 1.9		
Ingoa	Te whakamahi āhuahanga panoni hei whakaoti rapanga		
Kaupae	1	Whiwhinga	2
		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 Ine me te Āhuatanga, Te Panoni

8 *Ka whakatairite, ka whakamahi i ngā panoni papa-tahi, papa-maha hoki.*

9 *Ka tātari tauira hangarite mā te whakaatu i ngā panoni i hangaia ai aua tauira.*

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>Paetae Te whakamahi āhuahanga panoni hei whakaoti rapanga.</p>	<p>Hei tohu i te paetae:</p> <ul style="list-style-type: none"> • ka whiriwhiri, ka whakamahi i ētahi tikanga whānui hei whakaoti rapanga • ka whakaatu mōhiotanga ki ngā huatau āhuahanga, me ngā kupu e hāngai ana • ka whakamahi kupu āhuahanga, whakaahuahanga rānei hei whakamārama i ngā otinga.
<p>Kaiaka He kaiaka te whakamahi āhuahanga panoni hei whakaoti rapanga.</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 e hāngai ana – 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 te horopaki o te rapanga, te whakamahi rānei i ngā kīanga pāngarau hei whakawhitiwhiti whakaaro.
<p>Kairangi He kairangi te whakamahi āhuahanga panoni hei whakaoti rapanga.</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.
ētahi tikanga whānui	Kia toru, nui ake rānei ngā tikanga.

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

- ngā momo panoni (te whakaata, te huri, te neke me te whakarahi)
- te hangarite o ngā āhua me ngā tauira.

Kuputaka:
whakaaro tūhonohono relational thinking
whakaaro waitara abstract thinking

He Kōrero mō te Whakakapi

Koinei me te paerewa paetae 91033 hei whakakapi i te paerewa 5231, i te paerewa 5237 me te paerewa paetae 90150.

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