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 2014	**Date version published**	9 December 2010		

This achievement standard involves applying transformation geometry in solving problems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Apply transformation geometry in solving problems.	• Apply transformation geometry, using relational thinking, in solving problems.	• Apply transformation geometry, using extended abstract thinking, in solving problems.

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 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.

2 *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 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