Achievement Standard

Subject Reference	Calculus 3.3				
Title	Solve problems and equations involving trigonometric functions				
Level	3	**Credits**	4	**Assessment**	Internal
Subfield	Mathematics				
Domain	Trigonometry				
Status	Expiring			**Status date**	4 December 2012

This achievement standard is expiring. Assessment against the standard must take place before the expiry date set out below.

Expiry date	31 December 2013	**Date version published**	4 December 2012

This achievement standard involves solving problems using trigonometric functions to model situations and solving trigonometric equations.

	Achievement Criteria	Explanatory Notes
Achievement	• Solve straightforward problems with models involving trigonometric functions.	• Problems will involve a selection from given trigonometric functions of the form: – AsinB(x + C) + D – AcosB(x + C) + D – AtanB(x + C) + D where C or D may be zero. • Solution of the problems may require knowledge of amplitude, period, and frequency.
	• Solve straightforward trigonometric equations.	• Equations to be solved will involve a selection from the following forms: – AsinB(x + C) = K – AsinBx = K – AcosB(x + C) = K – AcosBx = K – AtanB(x + C) = K – AtanBx = K.

	Achievement Criteria	Explanatory Notes
Achievement with Merit	• Model situations using trigonometric functions and solve trigonometric problems.	• Candidates will be required to form an equation for the model and use the model to solve problems. – The form of the model will be selected from: $y = A\sin B(x + C) + D$ $y = A\cos B(x + C) + D$ $y = A\tan B(x + C) + D$ – Information that allows them to find A, B, C or D may be given or collected. The information may be in the form of data – Only one of C and D may be zero.
	• Use trigonometric manipulation.	• Manipulation will include a selection from proving trigonometric identities and solving more difficult equations. It will involve some of the following: – reciprocal relationships – Pythagorean identities – compound angle formulae – double angle formulae – sum and product formulae and combinations of these. • Where manipulation involves solving equations, candidates may be asked to provide: – a general solution – solutions within a specified domain.
Achievement with Excellence	• Apply knowledge of trigonometric relationships to solve more complex problem(s).	• Problem(s) will require a chain of reasoning and may involve: – a proof – developing a formula from a given starting point(s) – rewriting a trigonometric expression in terms of a single trigonometric function – identifying and rectifying a flaw in reasoning – evaluation of the model (limitations, improvements, long-term accuracy) where data has been collected – solving more complex equations – solving 3-D trigonometric problems. • Candidates will be required to choose and apply appropriate trigonometric relationships. (Knowledge of the sine and cosine rules may be required.)

General Explanatory Notes

1 This achievement standard is derived from *Mathematics in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1992:
- achievement objectives p. 164
- suggested learning experiences pp. 25, 27, 29, 165
- sample assessment activities p. 166
- mathematical processes pp. 24, 26, 28.

2 The use of appropriate technology is expected.

3 Candidates will be expected to use both radians and degrees.

4 Problems may include circular motion, pendulum motion, tides and biorhythms.

Replacement Information

This achievement standard and unit standard 5268 have been replaced by AS91575.

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 0226