Achievement Standard

Subject Reference	Calculus 3.5				
Title	Sketch graphs of conic sections and write equations related to conic sections				
Level	3	**Credits**	3	**Assessment**	External
Subfield	Mathematics				
Domain	Algebra				
Status	Registered	**Status date**	20 November 2006		
Planned review date	28 February 2009	**Date version published**	20 November 2006		

This achievement standard involves sketching graphs of conic sections and writing equations related to conic sections.

	Achievement Criteria	**Explanatory Notes**
Achievement	• Sketch graphs of conic sections and write equations related to conic sections.	• Graphs will be selected from the circle, ellipse, parabola and hyperbola. Completion of the square may be required. • Appropriate features must be indicated, for example: asymptotes and intercepts. • Equations may be in Cartesian or parametric form. • Writing equations will be for a given graph of a conic section.

	Achievement Criteria	**Explanatory Notes**
Achievement with Merit	• Solve problems involving conic sections.	• Problems involving modelling with conic sections may include contexts such as: bridges, cross sections of tunnels, profiles of shadows formed by light shades, ovals, cross sections of punchbowls. • Problems may involve finding: – equations of tangents or normals – points of intersection between lines and conics. Note: implicit or parametric differentiation may be required to find equations of tangents or normals.
Achievement with Excellence	• Solve more complex conic section problems.	• Problems may involve: – a proof – a chain of reasoning – loci – knowledge of eccentricity or directrix.

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. 124
- suggested learning experiences pp. 25, 27, 29, 125
- sample assessment activities p. 126
- mathematical processes pp. 24, 26, 28.

2 The shape of the conic section must be correct and its features accurately presented in a sketch. A plot is not required.

3 The use of appropriate technology is expected. However, graphs must be transferred correctly to the answer booklet.

Quality Assurance

1 Providers and Industry Training Organisations must be accredited by the Qualifications Authority 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 0226