Achievement Standard

Subject Reference Mathematics 2.3

Title Find and use straightforward derivatives and integrals

Level 2 **Credits** 4 **Assessment** External

Subfield Mathematics

Domain Calculus

Registration date 20 October 2004 **Date version published** 18 March 2005

This achievement standard requires finding and using straightforward derivatives and integrals.

Achievement Criteria

	Achievement Criteria	Explanatory Notes
Achievement	• Find and use straightforward derivatives and integrals.	• Assessment will involve finding derivatives and integrals of expressions given in expanded form with terms that have natural number exponents (eg $3x^4 + 2x^2 - 5x + 2$). • This may include demonstrating an understanding of the relationship between: – derivatives and gradients – integrals and areas. • Assessment could include: – evaluation of the derivative at a point to find the gradient – finding the point where the gradient has a given value – finding a simple area under a graph – finding the equation from the gradient function.

	Achievement Criteria	Explanatory Notes
Achievement with Merit	• Apply calculus techniques to solve straightforward problems.	• Assessment will be based on a selection from: – locating turning points where $f'(x) = 0$ and determining their nature – finding the equation of a tangent to a curve – solving rate of change problems (such as kinematics) – finding areas (including simple compound areas) under polynomial graphs. • Problems may be in a mathematical context. • Problems will involve polynomials in expanded form. • Interpretation of solutions in context may be required.
Achievement with Excellence	• Apply calculus techniques to solve problems.	• Assessment may involve: – forming equations – interpretation of results – optimisation – rates of change problems – areas – kinematics.

General Explanatory Notes

1 This achievement standard is derived from *New Zealand Curriculum*, Learning Media, Ministry of Education, 1992:
- achievement objectives p. 82
- suggested learning experiences p. 83
- sample assessment activities pp. 84-85
- mathematical processes p. 26.

2 Understanding of dy/dx, $f'(x)$ and $\int dx$ notations is expected.

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