NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Level 1, 2003

Mathematics: Use straightforward algebraic methods and solve equations (90147)

National Statistics

Assessment Report

Assessment Schedule

Mathematics: Use straightforward algebraic methods and solve equations (90147)

National Statistics

Number of Results	Percentage achieved			
	Not Achieved	Achieved	Merit	Excellence
39,067	50.1%	32.8%	12.7%	4.4%

Assessment Report

Every candidate for a National Certificate of Educational Achievement examination paper is expected to:
- read the question and do what the question asks
- allow adequate time to complete answers
- be accurate: check and/or proofread
- use appropriate technical terms
- bring the correct equipment
- write and/or draw clearly
- use pen if work is to be eligible for reconsideration.

General Comments

This standard requires candidates to use algebraic methods and solve equations at Achievement level. Too many candidates met the standard for only one aspect.

While informal methods may be appropriate for some questions at Achievement level, correct algebraic techniques are required for Achievement with Excellence. The Assessment Specifications indicated that for Achievement with Excellence, candidates are required to form and solve their own equations.

Assessment Schedule

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Evidence Statement

	Criteria	No.	Code	Evidence	Judgement	Sufficiency
Achievement	Use straightforward algebraic methods and solve equations.	One	A1	$6x^7$	No alternative.	**Achievement:** **three** of A1 and **two** of A2.
		Two	A1	$7x - 1$	No alternative.	
		Three	A1	75 cm^2	Accept 75.	
		Four	A1	$D = 2m + 6$	Or equivalent in words or variables.	
		Five				
		(a)	A2	$x = 0, -3$	Both answers needed. No alternative.	
		(b)	A2	$x = \frac{1}{2}$	Or equivalent.	
		(c)	A2	$x = 5.25 \quad \left(\frac{21}{4}\right)$	Or equivalent.	
Achievement with Merit	Use algebraic methods and solve equations in context.	Six	A1	$\frac{(x+3)(x+2)}{(x+3)}$	Or equivalent.	**Merit:** Achievement plus **two** M **Or** three M.
			M	$x + 2$	CAO acceptable.	
		Seven	A2 M	$x \le 12.27$ (2 d.p.) and 12	Must have both 12.27 with any correct rounding **and** 12.	
		Eight	M or A1, A2	$s = \$4.35$	Accept 4.35 (algebraic manipulation is required for A1).	

	Criteria	No.	Code	Evidence	Judgement	Sufficiency
Achievement with Excellence	Use algebraic strategies to investigate and solve problems	Nine		If x = width one garden and y = width other garden then $x(x + 2) = 11.25$ $y(y + 3) = 13.75$ combined width of gardens gives $x + y = 5$.	Problem must be modelled and equations formed. Or equivalent (Could be written in terms of one variable at initial stage or solved from first equation.)	**Excellence:** Merit plus 9.
			A1	Sub. for y gives $y^2 + 3y = 13.75$ $(5 - x)^2 + 3(5 - x) = 13.75$	Must have correct mathematical statements and a well-reasoned logical presentation.	
			A1	$x^2 - 13x + 40 = 13.75$; also, $x^2 + 2x = 11.25$		
			A2 or M	Subtracting these gives: $-15x + 40 = 2.5$ $x = 2.5$ $y = 2.5$	Must use algebra to derive result. Must interpret the problem in context.	
			E	Interpretation: herb garden length = 4.5 m width = 2.5 m. vegetable garden length = 5.5 m width = 2.5 m.	Units not required.	
			A1	**Or:** $x(x + 2) = 11.25$ $x^2 + 2x = 11.25$ **or** $x^2 + 2x - 11.25 = 0$		
			A1	$4x^2 + 8x - 45 = 0$		
			A2	$(2x - 5)(2x + 9) = 0$ $x = \frac{5}{2}$ or $x = -\frac{9}{2}$		
			M	$x = \frac{5}{2}$ so herb garden measures 2.5 m by 4.5 m.		
			E	$x + y = 5$, so $y = 2.5$ and vegetable garden measures 2.5 m by 5.5 m.		

Judgement Statement

Judgement statements (formerly referred to as sufficiency statements) help students understand how their overall results for each standard were arrived at.

Achievement	Achievement with Merit	Achievement with Excellence
Use straightforward algebraic methods **(A1)** *and solve equations* **(A2)** 3 × **A1** ***and*** 2 × **A2**	*Use algebraic methods and solve equations in context* **(M)** Achievement ***plus*** 2 × **M** ***or*** 3 × **M**	*Use algebraic strategies to investigate and solve problems* **(E)** Merit ***plus*** 1 **× E**

Note: Insufficient evidence to support a judgement above **(X)**