NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Level 2, 2003

Mathematics: Solve straightforward trigonometric equations (90292)

National Statistics

Assessment Report

Assessment Schedule

Mathematics: Solve straightforward trigonometric equations (90292)

National Statistics

Number of Results	Percentage achieved			
	Not Achieved	Achieved	Merit	Excellence
16,673	40.6%	42.1%	15.3%	2.0%

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

Candidates should be encouraged to answer all questions as it is common to use evidence from higher-level questions when awarding achievement. Questions One and Three were generally well done.

The standard requires candidates to solve trigonometric equations within a specified domain. Candidates who failed to do so, ie gave their answer in radians when the question required degrees, were not given credit for that question.

Many candidates did not appreciate the multiple-solution properties of trigonometric equations and consequently gave only one solution for each question. All solutions need to be given, even at Achieved level. For example, in Question Two many candidates failed to realise that four solutions were necessary. Premature rounding was a real problem with this question. It was regarded as a minor error if there was sufficient evidence of correct working.

Generally those candidates who sketched a graph of the problem, particularly in Question One, achieved far more success in the paper. For example Question Four was poorly done. The vast majority misinterpreted the question and tried to solve the problem for a height of 2 m instead of minus 2 m. Candidates should always use all the resources given. In this case the diagram supplied was very clear and helpful. Further, Question Five proved to be a difficult question, which many candidates did not attempt. However, those candidates who drew graphs to assist generally did very well.

Rounding continues to be a problem with candidates. Many candidates round incorrectly or round prematurely. Basic errors such as these should be rare at level two.

Assessment Schedule

Mathematics: Solve straightforward trigonometric equations (90292)

	Achievement Criteria	No.	Evidence	Code	Judgement Statement	Sufficiency
Achievement	Solve straight-forward trigonometric equations.	One (a) (b) (c)	$x = 17.5°$ and $162.5°$ $x = 25.8°$ and $334.2°$ $x = 1.064$ and 4.205	**A** **A** **A**	Answers to be given in units as stated in each domain. At least 2 s.f. are required. Degree symbol not required. Ignore minor errors.	**Achievement**: two of code **A**.
Achievement with Merit	Solve trigonometric equations.	Two Three Four	$x = \frac{1}{2}\cos^{-1}0.8$ $= 18.4°$ $x = 18.4°, 161.6°, 198.4°$ and $341.6°$ $t = \sin^{-1}0.1(20 - 12)$. $= 0.927$ seconds (53.1 seconds gets Achieved). $t = 2\cos^{-1}\left(\frac{-2}{3}\right)$ $= 4.601$ hours.	 **A** **M** **A M** **A M**	 Any 2 solutions. All 4 solutions needed.	**ACHIEVEMENT WITH MERIT**: Achievement **plus** two of Code **M** **Or** all of Code **M**.
Achievement with Excellence	Solve multi-step trigonometric equations.	Five	$110 - 15\cos 0.4\pi t = 120$ $\cos 0.4\pi t = \frac{-2}{3}$ $t = 1.83$ or 3.17 Number of seconds over 120 decibels in one period = 1.34 seconds. Number of seconds over 120 decibels in three periods = 4.02 seconds. Owner will be OK with 6 seconds.	**A** **M** **E**	One solution. Both solutions. Must show clear, logical setting out.	**Achievement with Excellence:** Merit **plus** code **E.**

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
Solve straightforward trigonometric equations **(A)** 2 × **A**	*Solve trigonometric equations* **(M)** Achievement ***plus*** 2 × **M** *or* 3 × **M**	*Solve multi-step trigonometric equations* **(E)** Merit ***plus*** **E**

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