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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Mathematics, 2008

90292 Solve straightforward trigonometric equations

Credits: Two
2.00 pm Monday 24 November 2008

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Make sure you have the Formulae Sheet L2-MATHF.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–5 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only	**Achievement Criteria**		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Solve straightforward trigonometric equations. ☐	Solve trigonometric equations. ☐	Solve multi-step trigonometric problems. ☐
Overall Level of Performance ☐		

You are advised to spend 25 minutes answering the questions in this booklet.

Assessor's use only

QUESTION ONE

Solve the following trigonometric equations.

(a) $\cos x = \frac{\sqrt{3}}{2}$, $0° \le x \le 360°$

(b) $\tan x + 1.58 = 1.3$, $0° \le x \le 360°$

(c) $4 \sin x = 0.5$, $0 \le x \le 2\pi$

QUESTION TWO

Solve $\tan^2 x = 4$, $0 \le x \le 2\pi$

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QUESTION THREE

The weight of a sick rabbit over a week is modelled by:

$$W = \cos 0.8t + 2.5,$$

where W = weight of the rabbit in kilograms, and t is the time in days since the rabbit was treated.

For how long during the week did the rabbit weigh less than 2.65 kg?

QUESTION FOUR

The temperature T°C in the rabbit cage over a 24-hour period can be modelled by the function

$T = 15 + \sin\frac{\pi t}{12}$, where t is the number of hours since the recording started.

For how long is the temperature above 14.6°C?

QUESTION FIVE

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The number of rabbits on an island is monitored for one year.
At any time after monitoring begins, an estimate of the number of rabbits, R, can be modelled by a function of the form:

$$R = \mathrm{A} - \mathrm{B}\sin \mathrm{C}t$$

where A, B and C are positive constants
and t is the time in months since the monitoring began.

The number of rabbits on the island is initially estimated to be 1 200.
The maximum number of rabbits is estimated to be 1 600.
The period of the model is 12 months.

For how long during the year of observation would the model predict there are more than 1 500 rabbits?

Extra paper for continuation of answers if required.
Clearly number the question.

Assessor's use only

Question number	