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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Mathematics, 2007

90292 Solve straightforward trigonometric equations

Credits: Two

2:00 pm Thursday 29 November 2007

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 a copy of Formulae Sheet L2-MATHF.

You should answer ALL the questions in this booklet.

Show ALL working.

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 2–6 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) $\sin x = 0.8,\ 0° \le x \le 360°$

(b) $3\tan x = -1.5,\ 0° \le x \le 360°$

(c) $3 + \cos x = 2.4,\ 0 \le x \le 2\pi$

QUESTION TWO

Assessor's use only

Solve $\cos^2 x = 0.09,\ 0 \le x \le 2\pi$

QUESTION THREE

The temperature T°C in Sarah's heated glass house during a 24-hour period can be modelled by the function

$$T = 28 + \cos\left(\frac{\pi t}{12}\right)$$

where t is the number of hours since midday.

At what time does the temperature in the glass house first drop to 27.5°C?

QUESTION FOUR

Assessor's use only

The heating system in Mark's glass house is different from the one in Sarah's glass house.
The manufacturer claims that the temperature of the glass house will remain constant at 28°C.

Mark records the difference in temperature from 28°C over a 6-hour period.
He finds the difference in temperature D can be modelled by the function

$$D = -3\cos t + 1$$

where t is the number of hours after he started recording.

For how long is the temperature above 28°C during the 6 hours that Mark recorded the temperature?

QUESTION FIVE

Assessor's use only

Tara has a glass house that is not heated.
She knows that, on the 1st November, the minimum temperature of 11 °C was recorded at 7 am and the maximum temperature of 27 °C was recorded at 1 pm.

Tara is trying to find the length of time, on 1st November, when the temperature inside the glass house was above 23 °C.

She chooses to model the temperature T °C inside the glass house by a function of the form

$$T = A\sin\left(\frac{\pi t}{12}\right) + B$$

where t is the number of hours since 7 am.

Between what times, **and** for how long, would she predict the temperature to have been above 23 °C?

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

Assessor's use only

Question number	

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