For Supervisor's use only

2

90292

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 2 Mathematics, 2006

90292 Solve straightforward trigonometric equations

Credits: Two
2.00 pm Wednesday 29 November 2006

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) $\tan x = 0.5, \quad 0° \le x \le 360°$

(b) $\sin x + 1 = 0.8, \quad 0° \le x \le 360°$

(c) $3\cos x = 1.8, \quad 0 \le x \le 2\pi$

QUESTION TWO

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

Assessor's use only

QUESTION THREE

Ashleigh is being pushed on a swing by her aunt.
The horizontal distance in metres, *d,* of the swing from Ashleigh's aunt is given by the equation:

$$d = -1.2\cos t + 1.2$$

where t is the time, in seconds, after the swing is released.

How much time is the swing **more than 2 m** from her aunt in any one motion of the swing?

QUESTION FOUR

Sarah and Scott are road bike training.
They begin their training together, at the same time and place.
The distance between Sarah and Scott varies constantly in a regular manner.
The distance that Sarah is ahead of Scott at any time, t,
can be modelled by the function

$$D = 5\sin\frac{\pi t}{30}$$

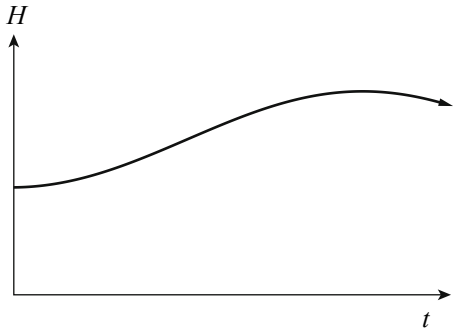
where D is the distance in metres of Scott from Sarah,
and t is in minutes.

After how many minutes will Sarah **first** be **more than** 2 metres ahead of Scott?

QUESTION FIVE

Assessor's use only

Sarah has a heart rate monitor attached as she trains on her bike for **one hour**.



Her initial and minimum heart rate is 100 beats per minute.
Her maximum heart rate during the session is 156 beats per minute.

Her heart rate can be modelled by the function

$$H = A\cos\frac{\pi t}{45} + B$$

where t is the time in minutes from the start of the training session
and H is her heart rate in beats per minute.

For how long is Sarah's heart rate above 145 beats per minute during her **one hour** training session?

Assessor's use only

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

Assessor's use only

Question number	