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90292

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 2 Mathematics, 2004

90292 Solve straightforward trigonometric equations

Credits: Two
2.00 pm Tuesday 23 November 2004

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 pages 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.

Achievement Criteria	*For Assessor's use only*	
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.

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TRIGONOMETRIC EQUATIONS

Show working.

QUESTION ONE

Solve the following trigonometric equations.

(a) $\cos\theta = 0.2,\ 0° \le \theta \le 360°$

(b) $3\sin\theta = 1.8,\ 0° \le \theta \le 360°$

(c) $\tan\theta - 2 = 0.5,\ 0 \le \theta \le 2\pi$

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QUESTION TWO

Solve the following trigonometric equations.

(a) $\cos(\theta + 45°) = -0.4,\ 0° \le \theta \le 360°$

(b) $\sin 2\theta = 0.7,\ 0 \le \theta \le \pi$

QUESTION THREE

Baby Georgie has a battery toy attached to a spring that hangs above her bed.
When the toy is started it oscillates.

The height H cm of the toy above the top of the bed at time t is given by

$$H = 5.5\sin t + 50$$

where values of t are to be taken in radians.

When will be the first time that the height of the toy is 55 cm above the bed?

QUESTION FOUR

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A ship runs aground on a reef. The water depth above the reef can be modelled by the function:

$$d = 8 - 2.5\cos\frac{\pi t}{6}$$

where d = the water depth above the reef in metres
and t = time in hours after low tide.

The ship can be refloated only when the depth of the water is at least 9.8 metres above the reef.

The ship cannot be refloated until after the low tide at 8:30 am the next morning.

Between what times would it next be possible to refloat the ship?

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

Assessor's use only

Question number

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

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