For Supervisor's use only

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90284

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 2 Mathematics, 2006

90284 Manipulate algebraic expressions and solve equations

Credits: Four
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 2–7 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**
Manipulate algebraic expressions. ☐		
Solve equations. ☐	Solve problems involving equations. ☐	Choose algebraic techniques and strategies to solve problem(s). ☐
Overall Level of Performance (all criteria within a column are met) ☐		

You are advised to spend 30 minutes answering the questions in this booklet.

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QUESTION ONE

Expand $(2x + 3)(x - 4)(x + 2)$

QUESTION TWO

Simplify $(16x^6)^{\frac{1}{2}}$

QUESTION THREE

Simplify $\frac{3}{x} + \frac{2x}{(x-1)}$

QUESTION FOUR

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Solve

(a) $2x^2 + 7x - 4 = 0$

(b) $6x - 4 < 3x - 12$

(c) $\log_x 64 = 3$

QUESTION FIVE

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Emma draws the graph of the circle $x^2 + y^2 = 25$.
She is then told to draw the graph of the line $x + y = -1$ on the same set of axes.

Find the coordinates of **both** points where the line intersects the circle.

QUESTION SIX

The lengths of the three sides of a right-angled triangle are $x - 2$, $2x$ and $x + 6$.
$x + 6$ is the longest side of the triangle.

What is the length of the **shortest** side of the triangle?
Show working to justify your answer.

QUESTION SEVEN

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A chemical was used to treat the water in a swimming pool.
The concentration of the chemical at 8 am was 200 mg per litre.
The concentration of the chemical in the water reduces by 30% each hour.

It is not safe to swim in a pool in which the concentration of the chemical is more than 25 mg per litre.

The concentration C mg per litre of the chemical in the water t hours after 8 am is given by

$$C = 200 \times 0.7^t$$

How many hours after 8 am will it be safe to swim in the pool?

$\frac{3}{x}+\frac{2x}{(x-1)}$

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

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Question number	