For Supervisor's use only

1

90147

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 1 Mathematics, 2005

90147 Use straightforward algebraic methods and solve equations

Credits: Four
9.30 am Monday 21 November 2005

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

You should answer ALL the questions in this booklet.

You should 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 2–8 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**
Use straightforward algebraic methods. ☐		Use algebraic methods and solve equations in context. ☐	Use algebraic strategies to investigate and solve problems. ☐
Solve equations. ☐			
Overall Level of Performance (all criteria within a column are met) ☐			

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

Assessor's use only

SQUARES

You should show **ALL** working.

QUESTION ONE

Solve these equations:

(a) $(x + 1)(4x - 1) = 0$

(b) $13x - 5 = 8x + 3$

(c) $\frac{4x + 1}{5} = 6$

QUESTION TWO

Expand and simplify:

$(2x - 3)(x + 1)$

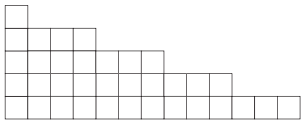
Assessor's use only

QUESTION THREE

Factorise completely:

$x^2 - 2x - 8$

QUESTION FOUR



The diagram shows a design made with 5 rows of small squares □.
The number of small squares, S, in the design is given by the formula:

$$S = \frac{R}{2}(3R - 1)$$

where R is the number of **rows** of small squares in the design.

Calculate the number of small squares, S, for a similar design that has **11 rows** of small squares.

$S =$ _____

QUESTION FIVE

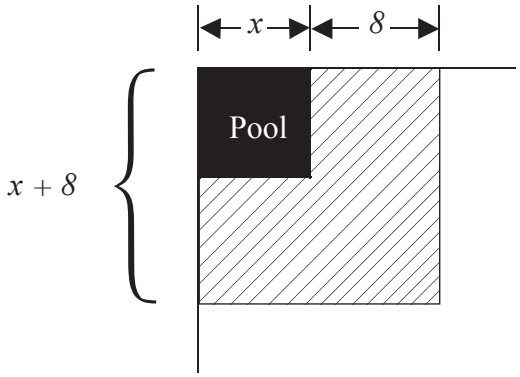
Simplify:

$\frac{x}{3} + \frac{x}{5}$

QUESTION SIX

Assessor's use only

The diagram shows a **square** courtyard with a **square** pool in one corner.



The area of the courtyard is 225 m^2, and the courtyard extends 8 m beyond the pool.

Solve the equation $225 = (x + 8)^2$, to find x, the **length of the side of the pool**.

Length of the side of the pool = _____ m

QUESTION SEVEN

Assessor's use only

Mr Smith spends $1210 on 1390 square tiles to use on the bathroom floor.
He buys S small tiles for 80 cents each and B big tiles for $1.50 each.

Solve the pair of simultaneous equations to find the **number of tiles of each size** that Mr Smith bought.

$0.8S + 1.5B = 1210$
$S + B = 1390$

Number of small tiles = _____

Number of big tiles = _____

QUESTION EIGHT

Assessor's use only

One **integer** is 5 more than twice another **integer**.
The squares of these two **integers** have a difference of 312.

Write **at least** ONE equation to describe this situation, and use it to find the TWO **integers**.

Show all your working.

Integers are _____ and _____

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.

Assessor's use only

Question number