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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Mathematics, 2007

90284 Manipulate algebraic expressions and solve equations

Credits: Four

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 2–7 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.

Assessor's use only

QUESTION ONE

Factorise $4x^2 + 5x - 6$

QUESTION TWO

Simplify fully $\log a + \log b - \log b^2$

QUESTION THREE

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

QUESTION FOUR

Assessor's use only

Solve

(a) $7x - 14 = 5(2x - 5)$

(b) $\log_x 125 = 3$

QUESTION FIVE

Emma and George both have mobile phones.
Emma's pricing plan is different from George's.
Emma pays 55 cents a call and 3 cents a minute.
George pays 51 cents a call and 4 cents a minute.

If a call costs the same on both plans, how long is the call?
You must show the equation(s) you use to solve the problem.

QUESTION SIX

Assessor's use only

Wiremu planted a tree that was 1.5 m high.
He is told that the tree will increase in height at a rate of 8% a year.
The height h metres of the tree can be modelled by the function

$$h = 1.5(1 + 0.08)^t$$

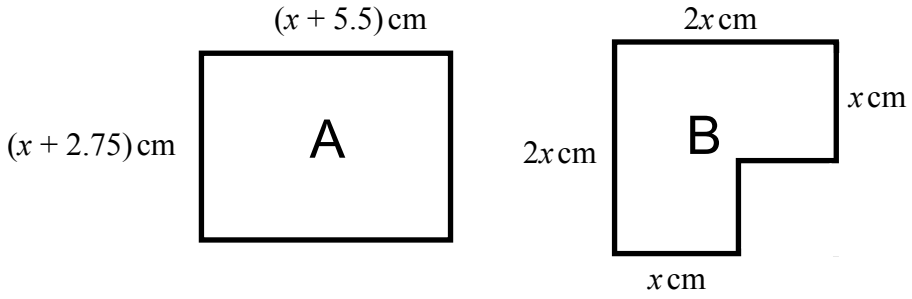
where t is the time in years since the tree was planted.

When will the height of the tree be 12 m?

QUESTION SEVEN

Assessor's use only

Shapes A and B below are made from rectangles.
For what value of x are the areas of shape A and shape B the same?



Diagrams NOT to scale

QUESTION EIGHT

Assessor's use only

Find the co-ordinates of the points of intersection of the graphs of $y = 5x + 14$ and $y = (x + 4)^2$.

QUESTION NINE

The roots of the equation $x^2 + 6x + c = 0$ are k and $k - 1$.

Find the value of c.

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

Assessor's use only

Question number	

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