To be completed by Candidate and School:	
Name:	
NSN No:	
School Code:	

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SUPERVISOR'S USE ONLY

DAY 1
TUESDAY

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Level 1 Mathematics and Statistics CAT, 2017

91027 Apply algebraic procedures in solving problems

Tuesday 19 September 2017
Credits: Four

You should attempt ALL the questions in this booklet.

Calculators may NOT be used.

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.

You are required to show algebraic working in this paper. 'Guess and check' and 'correct answer only' methods do not demonstrate relational thinking and will limit the grade for that part of the question to a maximum of Achievement. Guess and check and correct answer only may only be used a maximum of one time in the paper and will not be used as evidence of solving a problem.

A candidate cannot gain Achievement in this standard without solving at least one problem.

Answers must be given in their simplest algebraic form.

Where a question is given in words you will be expected to write an equation.

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.

ASSESSOR'S USE ONLY	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Apply algebraic procedures in solving problems.	Apply algebraic procedures, using relational thinking, in solving problems.	Apply algebraic procedures, using extended abstract thinking, in solving problems.
		Overall level of performance

QUESTION ONE

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(a) The distance, d cm, travelled by an object is given by

$$d = ut + 3t^2$$

If $u = 3$ and $t = 5$, calculate the distance that the object has travelled.

(b) Solve $2x^2 - 3x - 9 = 0$

(c) If $6x - y = 21$ and $-x + 6y = 14$, what is the value of $x - y$?

(d) Solve $9 \times 3^{x-4} > 87$ when x is a whole number.

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(e) Jane thinks of a number K.

When Jane's number is cubed, the answer is m times K.

When Jane's number is squared, it is n more than K plus 5.

Give an expression for n in terms of m only.

QUESTION TWO

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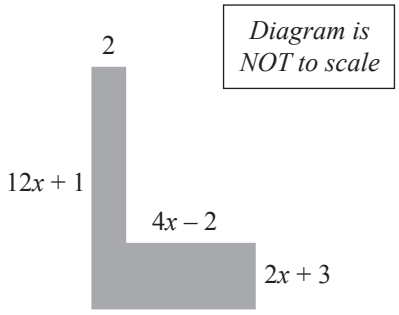
(a) $h = 9 - 4x^2$

Give the equation for x in terms of h.

(b) Simplify $\dfrac{x^2 - 5x + 4}{5x^2 - 20x}$.

(c) An L-shaped model is to be made from the following sketch.



(i) What is the perimeter of the model in terms of x?

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(ii) The area of the model is 92 cm^2.

What is the value of x?

(d) Leo is laying square concrete tiles for his deck.

He starts with laying them down to form a square pattern, but his friend thinks it would be better if they were laid out to form a rectangle.

He changes his layout to make the length of the deck 6 tiles longer, and the width of the deck 4 tiles shorter.

He finds he needs 2 extra tiles to complete the rectangular pattern.

How many tiles did he have to start with?

QUESTION THREE

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(a) The area of a rectangle can be represented by
$3x^2 + 2x - 40$

(i) State the length and width of this rectangle in terms of x.

(ii) Given that this quadratic expression represents the area of a rectangle, what would be the possible values of x?

Justify your answer.

(b) $2^{3x+4} > 2^{x^2}$

Find the value(s) of x.

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(c) Tane and Pete are raising funds for their sports trip.

Between them they need to raise $1000.

There are only 5 weeks until they need the money.

Tane gets paid $15 an hour, and Pete gets paid $16 an hour as he has more experience.

Between them they work for a total of 13 hours each week.

What is the average number of hours that each of them work per week if they are to have exactly the amount of money they need?

(d) A and B are two consecutive odd numbers, where $B > A$.

If $C = \frac{B}{A} - \frac{A}{B}$, give the value of C in terms of A,

and explain why this will always be $\frac{\text{an even number}}{\text{an odd number}}$.

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

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91027A