To be completed by candidate and school

Name: _____

NSN | | | | | | | | | | |

School Code | | | | |

1

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!

COMMON ASSESSMENT TASK

Level 1 Mathematics and Statistics, 2019

91027 Apply algebraic procedures in solving problems

Tuesday 17 September 2019
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

ASSESSOR'S USE ONLY

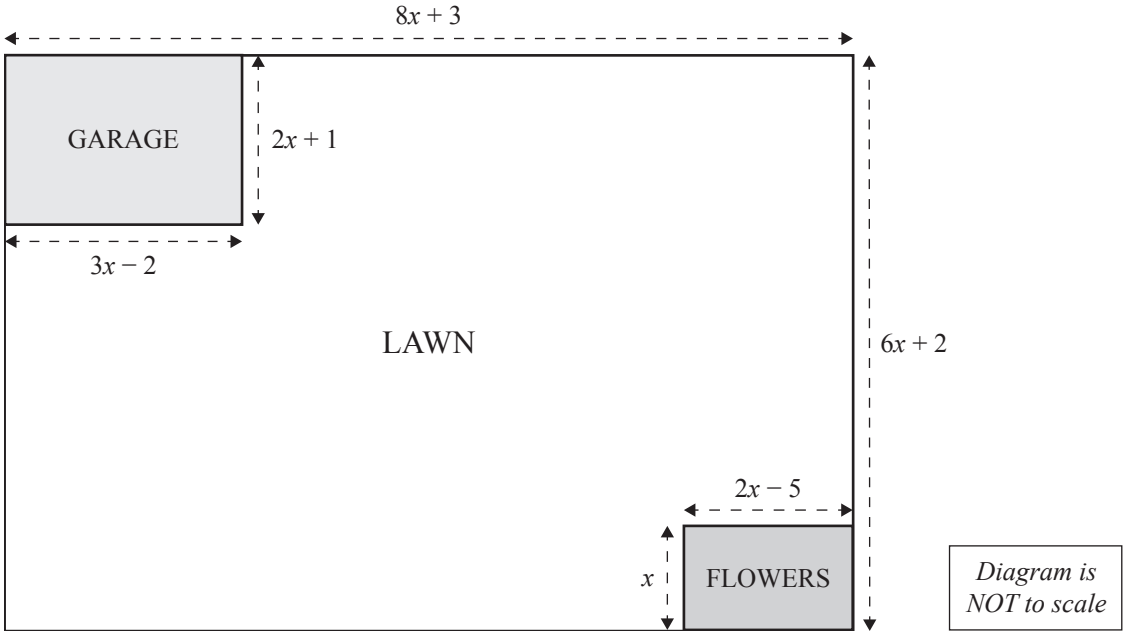
(a) What is the value of $2x^4 - 3x + 5$ when $x = -2$?

(b) Solve the equation $10x^2 - 27x - 9 = 0$

(c) Find the values of x if $36 \times 6^{2x+6} = 6^{x^2}$

ASSESSOR'S USE ONLY

(d) The plan of a rectangular garden is shown in the diagram below.



(i) If the perimeter of the LAWN is 290 metres, then find the value of x.
Note the lawn does not include the shaded garage or flowers.

(ii) If $L = x^2 + x + 1$, find an expression for the area of the LAWN, in terms of L.

QUESTION TWO

ASSESSOR'S USE ONLY

(a) (i) $w = pq^2 + r$.

Give the equation for p in terms of q, r, and w.

(ii) $fk^2 - 9c^2 = 4d^2 + 16gk^2$.

Give the equation for k in terms of c, d, f, and g.

(b) Simplify, as far as possible, $\dfrac{3x^2 + 9x}{x^2 - 9}$.

ASSESSOR'S USE ONLY

(c) Write $\frac{8x-1}{4}+\frac{3x-5}{3}$ as a simplified single fraction.

(d) Find the value of y so that the area of the right-angled triangle has the same value as the area of the rectangle, shown below.

All lengths are in cm. Note: Area of a Triangle = $\frac{1}{2}$ × base × height.

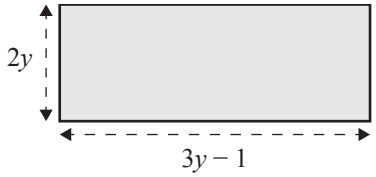
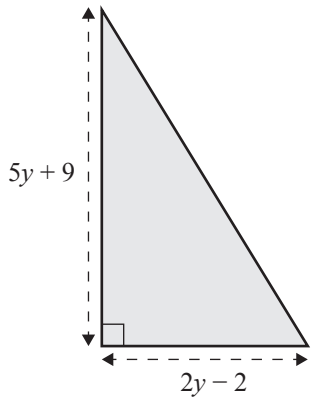


Diagram is NOT to scale



QUESTION THREE

ASSESSOR'S USE ONLY

(a) Mere gives some clues so that her secret number can be calculated.

She says, "When 20 is divided by my secret number and then 7 is added to this answer, this gives a solution of 2."

What is Mere's secret number?

(b) Solve the inequality $6(5 - 2x) - 4(5 - 3x) > 5(x + 4)$.

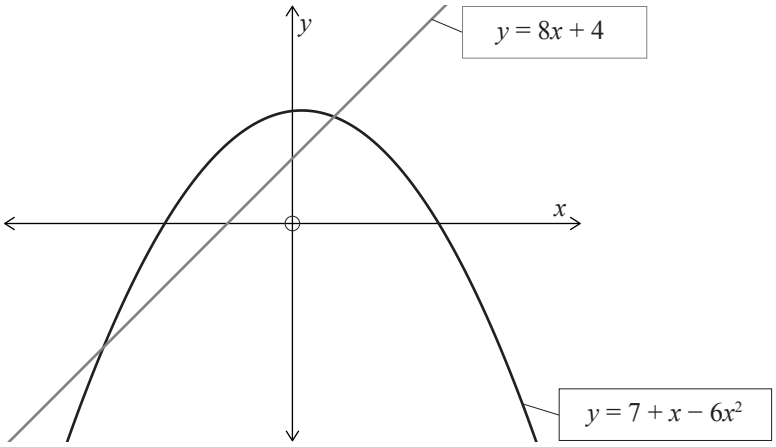
(c) Solve the equation $\frac{x+12}{x+4} = \frac{x+4}{x+2}$.

ASSESSOR'S USE ONLY

(d) The diagram below shows a sketch of part of the graph $y = 7 + x - 6x^2$.

Aroha draws another line onto this graph with equation $y = 8x + 4$.

Find the x-values of the two points where the two graphs intersect each other.



(e) The equation of the straight line passing through the points (–5, –10) and (9, 11) is given by $qy = px + 5$.

Using algebraic methods, find the values of the numbers p and q.

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

QUESTION NUMBER

ASSESSOR'S USE ONLY

91027A