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NEW ZEALAND QUALIFICATIONS AUTHORITY
 MANA TOHU MĀTAURANGA O AOTEAROA

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

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SUPERVISOR'S USE ONLY

Level 2 Mathematics and Statistics, 2017

91261 Apply algebraic methods in solving problems

2.00 p.m. Friday 24 November 2017
 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Apply algebraic methods in solving problems.	Apply algebraic methods, using relational thinking, in solving problems.	Apply algebraic methods, using extended abstract thinking, in solving problems.

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 attempt ALL the questions in this booklet.

Make sure that you have Formulae Sheet L2–MATHF.

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 methods, and correct answer(s) only, will generally limit grades to Achievement.

Check that this booklet has pages 2–12 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.

TOTAL

ASSESSOR'S USE ONLY

QUESTION ONEASSESSOR'S
USE ONLY

(a) Simplify the following, leaving your answer with positive indices:

(i) $3(4x)^{-2}$

(ii) $\left(\frac{16x^4}{x^6}\right)^{\frac{3}{2}}$

(b) Fully simplify the expression $\frac{2x^2 - 50}{9x^2 - 39x - 30}$.

- border
-
- $(n - 2)$ cm
- $(2n + 6)$ cm

The photo has sides of length $(n - 2)$ cm while the card has sides of $(2n + 6)$ cm.

- How many students finally went on the trip?
Justify your answer.

QUESTION TWOASSESSOR'S
USE ONLY

- (a) Solve the following equation for
- x
- :

$$\log_2 x = 10$$

- (b) Solve the following equation for
- x
- :

$$\log_x 49 = 2$$

Justify your answer.

- (c) Find the value of
- $\log_{\sqrt{5}} \left(\frac{1}{125} \right)$
- .

- Find the computer's value after six years.

(e) Make p the subject of the formula:

$$81^{\left(\frac{px}{q}-3\right)} = 243$$

ASSESSOR'S
USE ONLY

QUESTION THREEASSESSOR'S
USE ONLY

- (a) The quadratic equation $4x^2 + bx - 5 = 0$ has solutions $-\frac{1}{2}$ and $\frac{5}{2}$.

Find the value of b .

- (b) For what value(s) of m does the equation $6x^2 - mx = -3$ have two equal roots?

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- (e) Find the value(s) of m for which the equation $2^{mx-3} = 8^{x^2}$ has exactly one solution.

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

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