

To be completed by candidate and school

Name: _____

NSN

--	--	--	--	--	--	--	--	--	--

School Code

--	--	--	--

1

SUPERVISOR'S USE ONLY

**DAY 2
THURSDAY**



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 2022

91027 Apply algebraic procedures in solving problems

Thursday 15 September 2022

Credits: Four

You should attempt ALL the questions in this booklet. Show ALL working.

Calculators may NOT be used.

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 using algebra.

Answers must be given in their simplest algebraic form.

Where a question is given in words, you are expected to show the equation that you used to solve the problem.

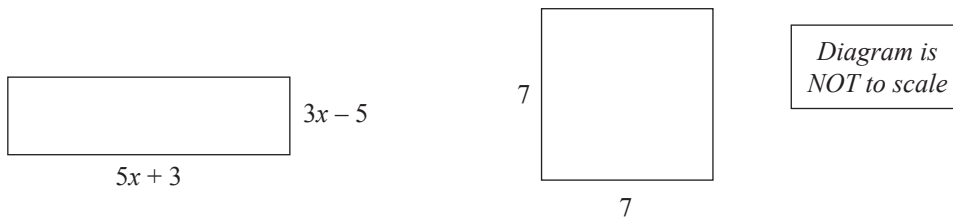
Check that this booklet has pages 2–16 in the correct order and that none of these pages is blank.

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		<input type="text"/>

QUESTION ONE

- (a) The rectangle and square, shown below, have the same **perimeter** as each other.



Find the value of x .

- (b) Simplify as far as possible $\frac{4x^2 - 25}{8x^2 - 22x + 5}$.

(c) Solve the following equation $\frac{x^2 - x - 6}{x^2 + 9x + 14} = \frac{3x}{2}$.

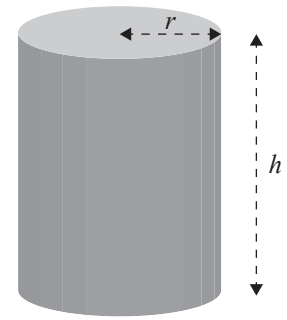
- (d) Hinewai played netball on Monday, Tuesday, and Wednesday.
On Tuesday, she scored three times as many goals as she did on Monday.
On Wednesday, she scored 16 more goals than she did on Monday.
Hinewai scored a total of 111 goals over the three days.

How many goals did she score on Wednesday?

- (e) The formula for the surface area, A cm², of a closed circular cylinder, where r is the radius in cm, and h is the height in cm, is given by

$$A = 2\pi r(r + h)$$

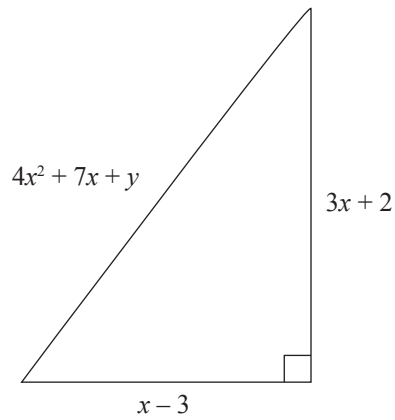
Find the radius of the cylinder with surface area 27π cm² and height 7.5 cm.



ASSESSOR'S
USE ONLY

QUESTION TWO

- (a) (i) Find the perimeter of the right-angled triangle shown below.
Fully simplify the expression.



*Diagram is
NOT to scale*

- (ii) If the area of this same triangle shown above is 7 cm^2 , then find the value of x .

$$\text{Area of a triangle} = \frac{1}{2} \times \text{base} \times \text{height}.$$

All measurements are in cm.

- (b) Find an equation for p , in terms of q , if $27 \times 3^{p+2q} = 9^{3q}$.

- (c) A company makes calculators.

The total cost, $\$P$, of making n calculators is given by the formula

$$P = 2a + bn$$

where a and b are some fixed numbers.

The cost of making 60 calculators is \$740.

The cost of making 160 calculators is \$840.

Calculate the cost of making 300 calculators.

- (d) Show that if you add the squares of three consecutive **even numbers** and then add 4, the result is a multiple of 3.

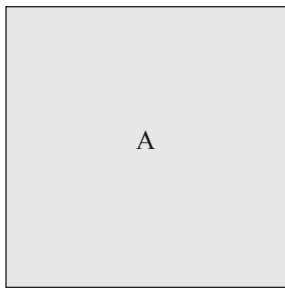
--

QUESTION THREEASSESSOR'S
USE ONLY

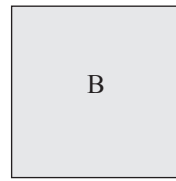
- (a) Find the value of $5 + 2(4xy^2 - z)$ when $x = 2$, $y = -2$, $z = 12$.

- (b) Solve the equation $5 \times 2^{5x-12} = 40$.

- (c) Using the two squares drawn below, calculate how much bigger the area of square A is than the area of square B.



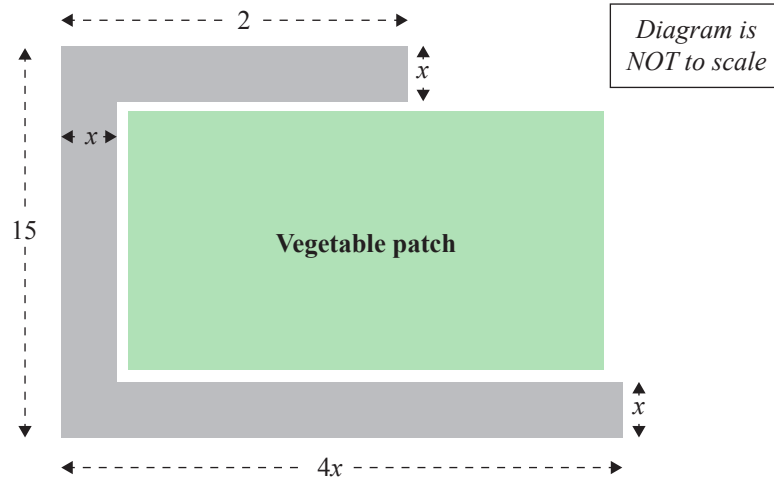
$$2x + 4y$$



$$2x - 4y$$

*Diagram is
NOT to scale*

- (d) Anahira wants to make a path around her vegetable patch, as shown in the diagram below.



The path has three rectangular sections. All measurements are in metres.

Anahira has concrete to make a path with a total area of 9 m^2 .

Find the width, x , of the path.

Question Three continues
on the next page.

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

QUESTION
NUMBER

91027