

To be completed by candidate and school

Name: _____

NSN

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School Code

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1

SUPERVISOR'S USE ONLY

See back cover for an English translation of this cover

TE RĀ 1
TŪREI



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

HE AROMATAWAI AROWHĀNUI

Te Pāngarau me te Tauanga, Kaupae 1, 2022

91027 Te whakamahi tikanga taurangi hei whakaoti rapanga

Tūrei, te 13 o Hepetema 2022

Ngā whiwhinga: E whā

Me whakamātau koe i ngā tūmahi KATOA kei roto i tēnei puka. Whakaaturia ngā whiriwhiringa KATOA. KĀORE e āhei ana te whakamahi tātaitai.

Ki te hiahia wāhi atu anō koe mō ō tuhinga, whakamahia te/ngā whārangi kei muri o tēnei puka, ā, āta tuhia te tau o te tūmahi.

Me mātua whakaatu koe i ngā whiriwhiringa taurangi ki tēnei pepa. Kāore ngā tikanga o 'te whakapae me te arowhai' me te 'whakautu tika anake' e whakaatu i te whakaaro whai pānga, ā, mā ērā, e herea ai te māka mō taua wāhanga o te tūmahi ki te taumata o Paetae. E āhei ana te whakamahinga kotahi anake o te 'whakapae me te arowhai' me te 'whakautu tika anake' i te pepa nei, ka mutu, kāore e whakamahia ērā hei taunakitanga mō te whakataunga o tētahi rapanga. E kore te ākongā e eke ki te Paetae i tēnei paerewa ki te kore ia e whakaoti i tētahi o ngā rapanga mā te whai i te mahi taurangi.

Me tuhi ngā otinga ki te āhua taurangi rūnā katoa.

Ina takoto te tūmahi hei kupu, e tika ana kia whakaaturia e koe te whārite i whakamahia rā e koe hei whakaoti i te rapanga.

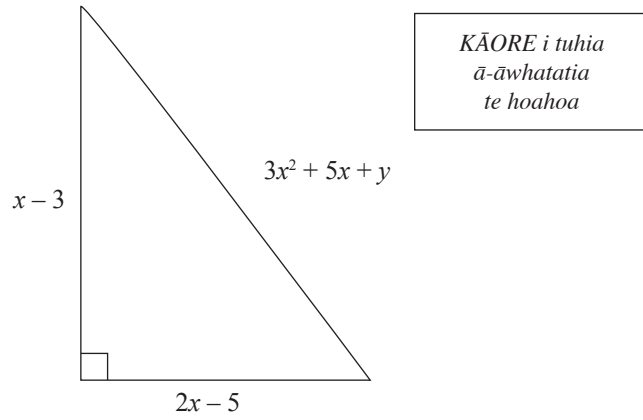
Tirohia kia kitea ai e tika ana te raupapa o ngā whārangi 2–27, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

ASSESSOR'S USE ONLY		
Paearu Paetae		
Paetae	Kaiaka	Kairangi
Te whakamahi tikanga taurangi hei whakaoti rapanga.	Te whakamahi tikanga taurangi, mā roto i te whakaaro whai pānga, i te wā e whakaoti rapanga ana.	Te whakamahi tikanga taurangi, mā roto i te whakaaro waitara e whānui ana, i te wā e whakaoti rapanga ana.
Te taumata whānui o te mahi <input type="text"/>		

TE TŪMAHI TUATAHI

- (a) (i) Whiriwhiria te paenga o te tapatoru hāngai e whakaaturia ana i raro nei.
Me āta rŭnā te kīanga.



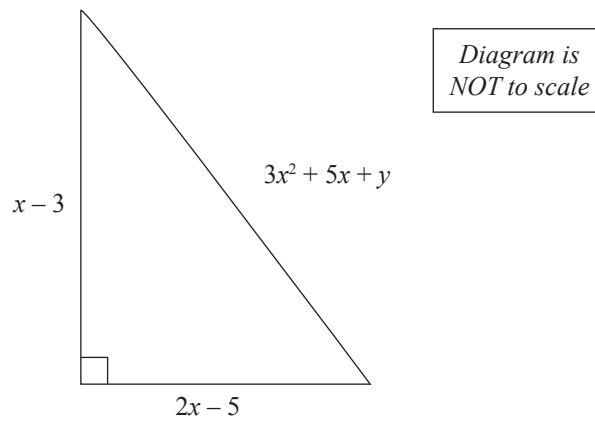
- (ii) Mēnā e 3 cm^2 te horahanga o te tapatoru o runga nei, tēnā, whiriwhiria te uara o x .

Ko te horahanga o te tapatoru $= \frac{1}{2} \times \text{pūtake} \times \text{teitei}$.

He cm ngā inenga katoa.

QUESTION ONE

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



- (ii) If the area of this same triangle shown above is 3 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) Whiriwhiria he whārite mō p , e ai ki a , q , mēnā e pēnei ana: $9 \times 3^{p+q} = 27^{2q}$.

- (c) Ka hanga rakiraki kirihou tētahi kamupene.

Ko te tapeke o te utu, $\$P$, hei hanga i ngā rakiraki kirihou n , kei te ture

$$P = 2a + bn$$

arā, he tau pūmau a me b .

Ko te utu hanganga o ngā rakiraki kirihou 140, ko te $\$580$.

Ko te utu hanganga o ngā rakiraki kirihou e 200, ko te $\$640$.

Tātaihia te utu hanganga o ngā rakiraki kirihou e 300.

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

- (c) A company makes plastic ducks.

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

$$P = 2a + bn$$

where a and b are some fixed numbers.

The cost of making 140 plastic ducks is $\$580$.

The cost of making 200 plastic ducks is $\$640$.

Calculate the cost of making 300 plastic ducks.

TE TŪMAHI TUARUA

- (a) Whiriwhiria te uara o te $4 + 2(5x^2y - z)$ mēnā e pēnei ana: $x = -2$, $y = 2$, $z = 10$.

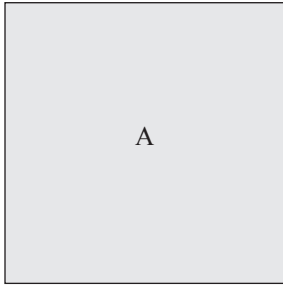
- (b) Whakaotia te whārite $3 \times 2^{4x-5} = 24$.

QUESTION TWOASSESSOR'S
USE ONLY

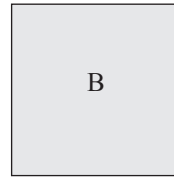
- (a) Find the value of $4 + 2(5x^2y - z)$ when $x = -2$, $y = 2$, $z = 10$.

- (b) Solve the equation $3 \times 2^{4x-5} = 24$.

- (c) Tirohia ngā tapawhā rite kua tuhia ki raro iho nei, ka tātai ai i te nui ake o te horahanga o te tapawhā rite A i tō te tapawhā rite B.



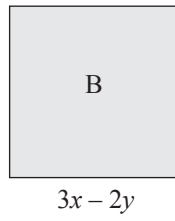
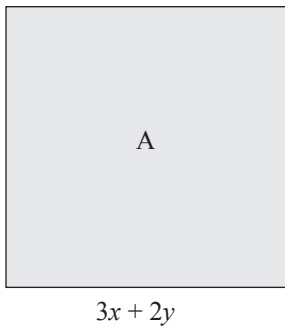
$3x + 2y$



$3x - 2y$

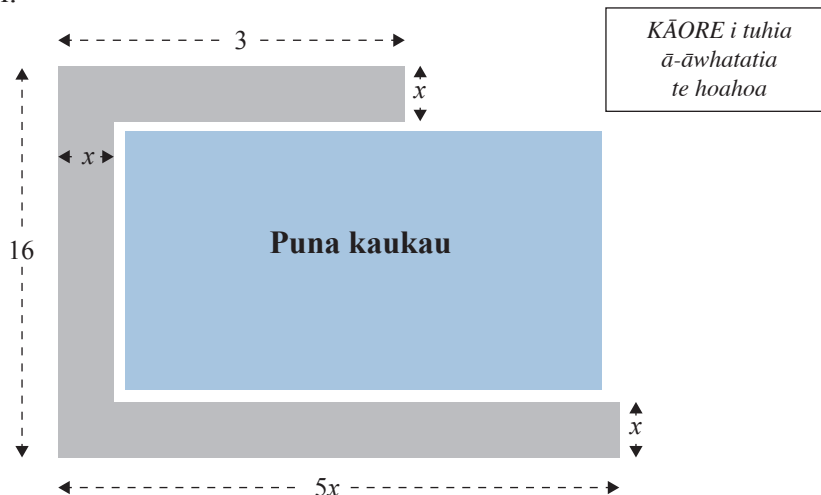
*KĀORE i tuhia
ā-āwhatatia
te hoahoa*

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



*Diagram is
NOT to scale*

(d) Kei te hiahia a Manaaki ki te hanga ara i te taha o tana puna kaukau, e whakaaturia ana i te hoahoa o raro nei.

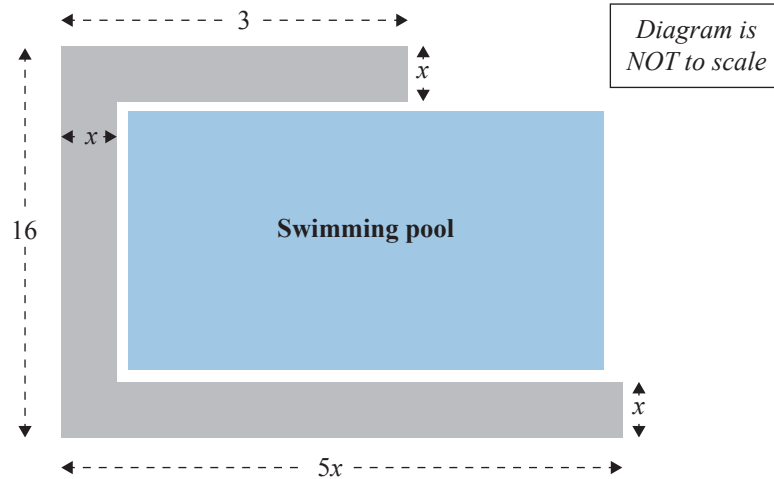


E toru ngā wāhanga tapawhā hāngai o te ara. He mita ngā inenga katoa.

He raima kei a Manaaki hei hanga ara, ko te tapeke o te horahanga o tērā, ko te 14 m².

Whiriwhiria te whānui, arā, te x , o te ara.

- (d) Manaaki wants to make a path around his swimming pool, as shown in the diagram below.



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

Manaaki has concrete to make a path with a total area of 14 m^2 .

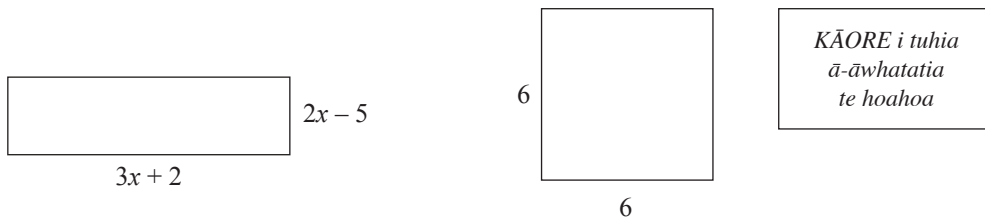
Find the width, x , of the path.

- (e) The number of small squares used in the n^{th} shape of a pattern is given by $n^2 - 2$.

Show that the difference in the number of small squares used between two consecutive **odd-numbered** shapes is always divisible by 4.

TE TŪMAHI TUATORU

- (a) He rite te **paenga** o te tapawhā hāngai ki tō te tapawhā rite e whakaaturia ana i raro nei.

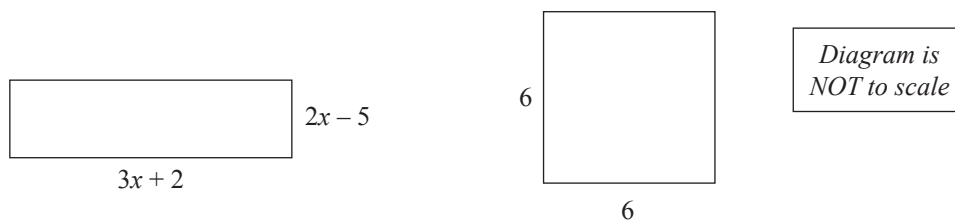


Whiriwhiria te uara o x .

- (b) Rūnātia ki tōna tānga rūnā katoa ka taea $\frac{9x^2 - 4}{15x^2 - 13x + 2}$.

QUESTION THREE

- (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 $\frac{9x^2 - 4}{15x^2 - 13x + 2}$.

- (d) I tākaro poitūkohu a Ihaka i a Mane, i a Tūrei me Wenerei.
I a Tūrei, i rearua ana whiwvinga i ērā i whiwhi rā ia i a Mane.
I a Wenerei, 17 te nui ake o ana whiwvinga i ana whiwvinga o Mane.
E 93 katoa ngā whiwvinga a Ihaka i ngā rā e toru.

E hia ana whiwvinga i a Wenerei?

*Ka rere tonu te Tūmahi Tuatoru i
te whārangi e whai ake nei.*

- (d) Ihaka played basketball on Monday, Tuesday, and Wednesday.
On Tuesday, he scored twice as many points as he did on Monday.
On Wednesday, he scored 17 more points than he did on Monday.
Ihaka scored a total of 93 points over the three days.

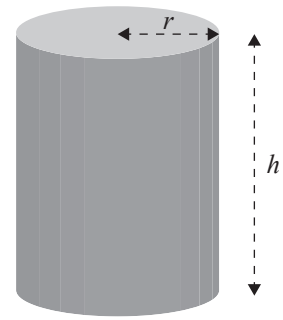
How many points did he score on Wednesday?

*Question Three continues
on the next page.*

- (e) Anei te ture e puta ai te horahanga mata, arā, te A cm², o tētahi rango porotaka kati, e tohua ai te pūtoro e r hei cm, ā, ko h te teitei hei cm,

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

Whiriwhiria te pūtoro o te rango, e 33π cm² nei tana horahanga mata, ā, e 9.5 cm tana teitei.



**He whārangi anō ki te hiahiatia.
Tuhia te tau tūmahi mēnā e hāngai ana.**

TE TAU
TŪMAHI

MĀ TE
KAIMĀKA
ANAKE

He whārangī anō ki te hiahia. Tuhia te tau tūmahi mēnā e hāngai ana.

TE TAU
TŪMAHI

MĀ TE
KAIMĀKA
ANAKE

English translation of the wording on the front cover

**DAY 1
TUESDAY**

COMMON ASSESSMENT TASK

Level 1 Mathematics and Statistics 2022

91027 Apply algebraic procedures in solving problems

Tuesday 13 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 2–27 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"/>		

91027MA