Mā te Kaiwhakauru me te Kura e whakaoti:	
Ingoa:	
Tau NSN:	
Waehere Kura:	

1

SUPERVISOR'S USE ONLY

RĀ 1
RĀTŪ

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Te Pāngarau me te Tauanga CAT, Kaupae 1, 2017

91027M Te whakahāngai tūāhua taurangi hei whakaoti rapanga

Rātū 19 Mahuru 2017
Whiwhinga: Whā

Me whakamātau koe i ngā tūmahi KATOA kei roto i tēnei pukapuka.

KĀORE e whakaaetia ngā tātaitai.

Whakaaturia ngā mahinga KATOA.

Mēnā ka hiahia whārangi atu anō koe mō ō tuhinga, whakamahia te (ngā) whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i te tau tūmahi.

Me whakaatu e koe ngā mahinga taurangi i tēnei pepa. Kāore e whakaaturia te whakaaro whaipānga mā te whakamahi anake i ngā tikanga o te kimikimi ka tirotiro me te whakatika, ā, ka herea te taumata mō tērā wāhanga o te tūmahi ki te taumata Paetae. Ka taea anake te whakamahi ngā tikanga o te kimikimi ka tirotiro me te whakatika mō te wā kotahi noa iho i roto i tēnei pepa, ā, kāore e whakamahia tēnei hei taunakitanga o te whakaoti rapanga.

Me mātua whakaoti i te ākonga tētahi rapanga i te iti rawa kia taea ai te taumata Paetae i tēnei paerewa.

Me tuhi ngā otinga ki te āhua taurangi rūnā rawa.

Ina tuhia tētahi tūmahi ki te rerenga kupu me whakamahi koe i tētahi whārite.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–15 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

ME HOATU KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

MĀ TE KAIMĀKA ANAKE	Paearu Paetae	
Paetae	**Kaiaka**	**Kairangi**
Te whakahāngai tūāhua taurangi hei whakaoti rapanga.	Te whakahāngai tūāhua taurangi mā te whakaaro whaipānga hei whakaoti rapanga.	Te whakahāngai tūāhua taurangi mā te whakaaro waitara hōhonu hei whakaoti rapanga.
		Whakakaotanga o te tairanga mahinga

TŪMAHI TUATAHI

MĀ TE KAIMĀKA ANAKE

(a) Ko te tawhiti, d cm, o te haere o tētahi ahanoa ka whakaaturia e

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

Mēnā $u = 3$ me $t = 5$, tātaihia te tawhiti i haere ai te ahanoa.

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

(c) Mēnā $6x - y = 21$ me $-x + 6y = 14$, he aha te uara o $x - y$?

(d) Whakaotihia $9 \times 3^{x-4} > 87$ ina ko x he tauoti.

QUESTION ONE

ASSESSOR'S USE ONLY

(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.

(e) Ka whakaaro a Jane mō tētahi tau K.

Ina pūtorutia te tau o Jane, ko m whakareatia ki K te whakautu.

Ina pūruatia te tau o Jane, he nui ake mā te n i te K me te 5.

Tuhia tētahi kīanga mō n e pā ana ki m anake.

MĀ TE KAIMĀKA ANAKE

ASSESSOR'S USE ONLY

(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.

TŪMAHI TUARUA

MĀ TE KAIMĀKA ANAKE

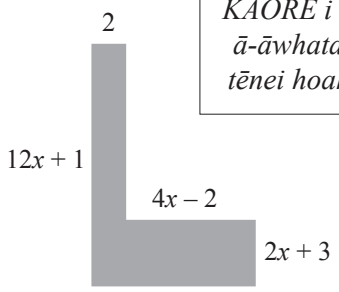
(a) $h = 9 - 4x^2$

Tuhia te whārite mō x e pā ana ki h.

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

(c) Ka hangaia he hanga āhua-L mai i te tuhi haehae e whai ake nei.

KĀORE i tuhi ā-āwhatatia tēnei hoahoa



(i) He aha te paenga o te hanga e pā ana ki x?

MĀ TE KAIMĀKA ANAKE

(ii) Ko te horahanga o te hanga ko 92 cm^2.

He aha te uara o x?

(d) Kei te whakatakoto taera raima tapawhā rite a Leo mō tōna rahoraho.

Ka tīmata ia ki te whakatakoto i ngā taera kia noho hai tauira tapawhā rite, engari e ai ki tōna hoa, he pai ake kia noho hai tapawhā hāngai.

Ka tīni ia i tōna tahora kia roa ake te rahoraho mā te 6 taera, ā, kia poto iho te whānui o te rahoraho mā te 4 taera.

Ka kite ia me whai taera e 2 anō hai whakaoti i te tauira tapawhā hāngai.

E hia ōna taera i te tīmatanga?

QUESTION TWO

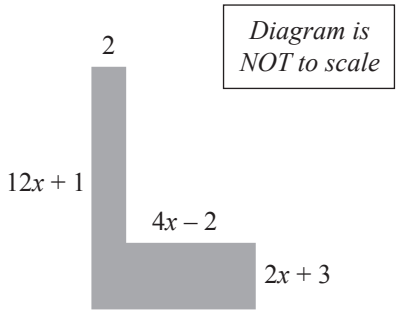
ASSESSOR'S USE ONLY

(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?

ASSESSOR'S USE ONLY

(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?

TŪMAHI TUATORU

MĀ TE KAIMĀKA ANAKE

(a) Ka taea te horahanga o te tapawhā hāngai te whakaatu e
$3x^2 + 2x - 40$

(i) Tuhia te roa me te whānui o tēnei tapawhā hāngai e pā ana ki x.

(ii) Nā te mea ka whakaaturia e tēnei kīanga pūrua te horahanga o tētahi tapawhā hāngai, he aha ngā uara ka taea mō x?

Parahautia tō tuhinga.

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

Kimihia te (ngā) uara o x.

QUESTION THREE

ASSESSOR'S USE ONLY

(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.

MĀ TE KAIMĀKA ANAKE

(c) Kei te kohi pūtea a Tane rāua ko Pete mō tā rāua haerenga hākinakina.

Me taki kohi e rāua te $1000.

E 5 wiki noa iho kei te toe ki te kohi i te pūtea.

Ka utua a Tane ki te $15 i ia hāora, ā, ka utua a Pete ki te $16 i ia hāora nā te mea he nui ake ōna wheako.

I waenga i a rāua ka mahi mō te 13 hāora tapeke i ia wiki.

He aha ngā hāora toharite me mahi e ia o rāua i ia wiki ki te eke ki te rahi pū o te pūtea e hiahiatia ana e rāua?

(d) He taukehe piri tata e rua te A me te B, ina $B > A$.

Mēnā $C = \frac{B}{A} - \frac{A}{B}$, tuhia te uara o C e pā ana ki A,

ka whakamāramatia te take ka puta $\frac{\text{he taurua}}{\text{he taukehe}}$ i ngā wā katoa.

ASSESSOR'S USE ONLY

(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 $\frac{\text{an even number}}{\text{an odd number}}$.

He whārangi anō ki te hiahiatia.
Tuhia te (ngā) tau tūmahi mēnā e tika ana.

TAU TŪMAHI

MĀ TE KAIMĀKA ANAKE

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

QUESTION NUMBER

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English translation of the wording on the front cover

Level 1 Mathematics and Statistics CAT, 2017

91027 Apply algebraic procedures in solving problems

Tuesday 19 September 2017
Credits: Four

91027MA

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 2–15 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.