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RĀ 2 RĀPARE

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

Rāpare 21 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 RAWA KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

TŪMAHI TUATAHI

(a) Ko te horahanga, *A* m², ka whakaraimahia mō tētahi huarahi, wāhi hūhunu anō hoki, ka whakaaturia e

$$A = xy + 5y^2$$

Mēnā $x = 2$ me $y = 4$, tātaihia te horahanga hei whakaraima.

(b) Whakaotihia $3x^2 + 8x - 16 = 0$.

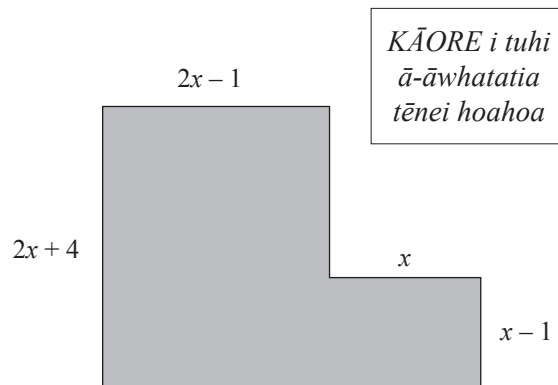(c) Ka hangaia he mahere mā te tūhono i ngā tapawhā hāngai e rua.

KĀORE i tuhi ā-āwhatatia tēnei hoahoa

$2x - 1$

$2x + 4$

x

$x - 1$

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

(ii) Ko te horahanga o te mahere he 146 cm^2.

He aha te uara o x?

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(d) Ka whakaaro a Riki mō tētahi tau N.

Ina pūruatia te tau o Riki, ka whiwhi ia k iti iho i N me 4.

Ina pūtorutia te tau o Riki, ko m whakareatia ki N te whakautu.

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

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QUESTION ONE

(a) The area, A m², to be concreted for a pathway and barbecue area is given by

   $A = xy + 5y^2$

   If $x = 2$, and $y = 4$, calculate the area to be concreted.
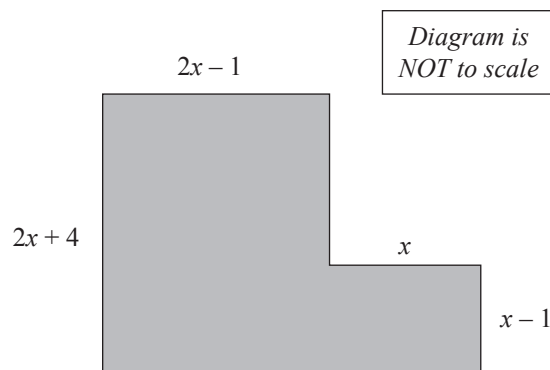
(b) Solve $3x^2 + 8x - 16 = 0$.

(c) A plan is made by joining two rectangles.

Diagram is
NOT to scale

$2x - 1$

$2x + 4$

x

$x - 1$

(i) What is the perimeter of the plan in terms of x?

(ii) The area of the plan is 146 cm².

What is the value of x?

(d) Riki thinks of a number N.

When Riki's number is squared, he gets k less than N plus 4 .

When Riki's number is cubed, the answer is m times N .

Give an expression for k in terms of m only.

TŪMAHI TUARUA
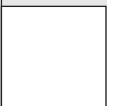
(a) Ka taea te horahanga o te tapawhā hāngai te whakaatu e:

$$3x^2 - 4x - 32$$

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

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

Parahautia tō tuhinga.

(b) Mēnā $x - 5y + 15 = 0$ me $-5x + y + 21 = 0$, he aha te uara o $x + y$?

QUESTION TWO

(a) The area of a rectangle can be represented by:

$$3x^2 - 4x - 32$$

(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) If $x - 5y + 15 = 0$ and $-5x + y + 21 = 0$, what is the value of $x + y$?

(c) Kei te whakaaro a Jane ki te hanga taiapa hei nōhanga mō tōna reme mōkai.

Ka mea atu te pāpā o Jane i te whakaaro ia kia tapawhā rite te nōhanga, ā, kia x te roa o ngā taha.

Ka whakatau a Jane kia noho hai tapawhā hāngai roa ake mā te 5 mita i x, ā, whānui ake anō hoki mā te 2 mita i x.

Ka mea atu te pāpā o Jane he rahi ake te pēne o Jane mā te 24 m², tēnā i te pēne i whakaarohia e ia te hanga.

He aha te horahanga o te pēne i whakaarohia e te pāpā o Jane ki te hanga?

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(d) Kei te hararei a Pita mō ngā wiki e 5.

Ka tiaki ia i ngā ngeru mōkai, kurī hoki ina haere ai ō rātau rangatira.

Ka haere ana a Pita ki te hararei, mā tōna hoa noho e whāngai i ngā mōkai 13 e tiakina ana e ia.

E \$445 te tapeke ka whakapauhia e Pita ki ngā kai mō ngā mōkai i mua i tōna wehenga.

Ko te toharite mō te hoko i te kai i te wiki kotahi ko te \$5 mō te ngeru kotahi, ā, ko te \$9 mō te kurī kotahi.

E hia ngā ngeru, e hia hoki ngā kurī i a Pita hei whāngaitanga mā te hoa noho?

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(c) Jane is planning to fence an area for her pet lamb .

Jane's father tells her that he had planned to make it square with the sides of length x.

Jane decides to make it a rectangle with the length 5 metres longer than x, and the width 2 metres wider than x.

Jane's father says the area of Jane's pen is 24 m² larger than what he had planned to make.

What was the area of the pen that Jane's father had planned to make?

(d) Pita is going on holiday for 5 weeks.

He looks after pet cats and dogs when their owners go away.

While Pita goes on holiday, his neighbour is going to feed the 13 pets he is looking after.

Pita spends a total of $445 on the food for the pets before he leaves.

On average the cost for food for a week is $5 to feed one cat, and $9 to feed one dog.

How many cats and how many dogs did Pita have for the neighbour to feed?

TŪMAHI TUATORU

(a) $n = 9m^2 - 16$

Tuhia te whārite mō m e pā ana ki n.

(b) Whakarūnāhia $\dfrac{6x^2 - 18x}{2x^2 - 7x + 3}$.

(c) $5^{x^2-6} > 5^x$

Kimihia te (ngā) uara o x.

QUESTION THREE

(a) $n = 9m^2 - 16$

Give the equation for m in terms of n.

(b)   Simplify $\dfrac{6x^2 - 18x}{2x^2 - 7x + 3}$.

(c) $5^{x^2 - 6} > 5^x$

Find the value(s) of x.

(d)   Whakaotihia $16 \times 4^{x-5} > 65$ ina ko x he tauoti.

(e)   He taurua piri tata e rua te A me te B ina $B > A$.

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

ā, ka whakamārama i te take ka puta $\dfrac{\text{he taurua}}{\text{he taurua}}$ i ngā wā katoa.

(d) Solve $16 \times 4^{x-5} > 65$ when x is a whole number.

(e) A and B are two consecutive even numbers where $B > A$.

If $C = \dfrac{B}{A} - \dfrac{A}{B}$, give the value of C in terms of A,

and explain that this will always be $\dfrac{\text{an even number}}{\text{an even number}}$.

TAU TŪMAHI

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

TAU TŪMAHI

QUESTION
NUMBER

QUESTION
NUMBER
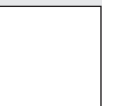
English translation of the wording on the front cover

Level 1 Mathematics and Statistics CAT, 2017

91027 Apply algebraic procedures in solving problems

Thursday 21 September 2017
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 2–15 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.