WERERUNDAN WERERUNDAN WERERU

91261M





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

Te Pāngarau me te Tauanga, Kaupae 2, 2018

91261M Te whakahāngai tūāhua taurangi hei whakaoti rapanga

9.30 i te ata Rāapa 14 Whiringa-ā-rangi 2018 Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakahāngai tūāhua taurangi hei whakaoti rapanga.	Te whakahāngai tūāhua taurangi mā te whakaaro whaipānga hei whakaoti	Te whakahāngai tūāhua taurangi mā te whakaaro waitara hōhonu hei whakaoti
	rapanga.	rapanga.

Tirohia mēnā e rite ana te Tau Ākonga ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

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

Tirohia mēnā kei a koe te Puka Tikanga Tātai L2-MATHMF.

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. Ko te tikanga, mā te whakamahi i ngā tikanga o te kimikimi ka tirotiro, me te whakautu tika noa iho, ka herea te ākonga ki te taumata Paetae.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–23 kei roto i tēnei pukapuka, ā, 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.

TAPEKE



TŪMAHI TUATAHI

MĀTE
KAIMĀKA
ANAKE

	Whakarūnā katoatia $(25m^{16})^{\frac{1}{2}}$
1	Whakarūnā katoatia $\left(\frac{4}{3a}\right)^{-2}$, ā, kia tōrunga te taupū ki tō tuhinga.
	Tuhia $4 - \frac{b + 8c}{3c}$ hei hautanga kotahi ki tōna āhua rūnā rawa atu.
	Whakatauwehea katoatia $4bx + 2xy - 6ab - 3ay$

QUESTION ONE

ASSESSOR'S
LISE ONLY

			1
(a)	Simplify fully	$(25m^{16})$	$)^{\overline{2}}$

(b)	Simplify fully	$\left(\frac{4}{3a}\right)^{-2}$	leaving your answer wi	th a positive index
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(c)	Write $4 - \frac{b + 8c}{3c}$	as a single fraction in its sim	plest form
` ′	3c	•	-

(d)	Factorise fully	y 4bx + 2xy	-6ab-3av



4 Kāore he taupoki o tētahi pouaka tapawhā hāngai. Ko te roa o te kaupapa he 60 cm. Ko te teitei he hauwhā o te whānui me te roa. Ko te horahanga tapeke o te kaupapa **me** ngā taha e whā o te pouaka he 7400 cm². Tātaihia te teitei o te pouaka.

(e)

3	
A rectangular box has no lid. The length of the base is 60 cm.	
Its height is one quarter of the sum of its width and length.	w
The total area of the base and the four sides of the box is 7400 cm ² .	∢ 60 cm >
Find the height of the box.	

Kimihia ngā kīanga mō a me b e ai ki x , y rānei.	
Killinia liga kialiga ilio a lile b c al ki x , y faller.	

TŪMAHI TUARUA

MĀ TE KAIMĀKA ANAKE

- (a) Whiriwhiria x mēnā $\log_x 243 = 5$
- (b) Whiriwhiria m mēnā $\log_3(4m-1)=2$
- (c) Kimihia tētahi kīanga mō x e pā ana ki w mēnā $\frac{3^{4x+1}}{9^x} = 27^{\frac{w}{3}}$

QUESTION TWO

ASSESSOR'S USE ONLY

(a) Find x if $\log_x 243 = 5$

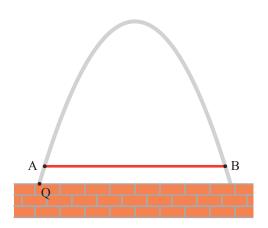
(b) Find *m* if $\log_3(4m - 1) = 2$

(c) Find an expression for x in terms of w if $\frac{3^{4x+1}}{9^x} = 27^{\frac{w}{3}}$

(d) He tīwhana unahi tō tētahi peke hōiho e mau ana ki tētahi pātū. Ka peke ngā hōiho me ngā kaieke mā te tīwhana.







 $\label{linear_matter} M\bar{a}t\bar{a}puna: http://luxequestrian.com/slideshow/incredible-jumps-brody-robertson$

He 2.43 mita te teitei o te tīwhana i runga ake i te pātū.

Ka taea te tīwhana te whakatauira mā tētahi pānga o te āhua h(x) = kx(3.6 - x), ina ko k he aumou, ko te h mita te teitei i runga ake i te pātū, ā, ko te x mita te tawhiti huapae mai i Q.

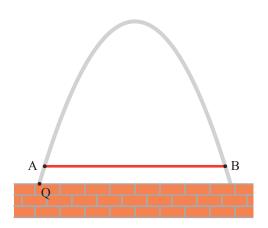
Ka taea tētahi kahokaho AB te whakamau ki runga ake i te pātū kia mau ai ia pito ki te tīwhana. Mō tētahi whakataetae kotahi, ka raua te kahokaho kia 0.5 mita i runga ake i te pātū.

E nia te roa o te kanokano AB?		

(d) An equestrian jump has a parabolic arch mounted on a wall. Horses and riders jump through the arch.







Source: http://luxequestrian.com/slideshow/incredible-jumps-brody-robertson

The arch rises 2.43 metres above the wall.

The arch can be modelled by a function of the form h(x) = kx(3.6 - x), where k is a constant, h metres is the height above the wall, and x metres is the horizontal distance from Q.

A rail AB can be placed above the wall and attached at each end to the arch. For one competition, the rail is placed 0.5 metres above the wall.

How long is the rail AB?	

ASSESSOR'S
USE ONLY

		14	
(e)		KAI	IĀ TE IMĀK NAKE
	Mēn	\bar{a} ko te rahinga tapeke o te haumitanga i muri i te n tau he A , ko $A = P\left(1 + \frac{r}{100}\right)^n$	NANE
	ina l	xo r% te utu huamoni pūrua i te tau.	
	(i)	Ka haumi a Anushka i te \$20 000 ki te utu huamoni o te 3.85% (arā, ko $A = P(1.0385)^n$).	
		E hia ngā tau kia eke ai te rahinga o tana haumitanga ki te \$25 000?	
	(ii)	Ka haumi a Semisi i ana moni i tētahi utu huamoni rerekē i te haumitanga a Anushka.	
		Ka huarua te uara o tana haumitanga i muri i te tekau mā rua tau.	
		He aha te utu huamoni (ōrau) mō te haumitanga a Semisi?	

		15						
e)		rest is compounded on a principal investment, P , at the end of each year.	ASSESSOF USE ONL					
	If th	e total amount of the investment after <i>n</i> years is \$A then $A = P\left(1 + \frac{r}{100}\right)^n$						
		re $r\%$ is the compound interest rate per year.						
	(i)	Anushka invests \$20 000 at an interest rate of 3.85% (so $A = P(1.0385)^n$).						
		How many years will it take for her investment to be worth \$25 000?						
	(ii)	Semisi invests his money at a different interest rate than Anushka's investment.						
	(11)	His investment will double in value after twelve years.						
		What is the interest rate for Semisi's investment?						

TŪMAHI TUATORU

(a) Whakaotia ia whārite e whai ake nei m \bar{o} x:

(i) $12x^2 - 5x = 2$

(ii) $x+1-\frac{3}{x}=0$

(b) Me whakaatu kāore e haukotia te kauwhata o te pānga $y = 2x^2 - 5x + 6$ i te tuaka-x.

Me mātua whakamahi i te taurangi hei tautoko i tō tuhinga.

QUESTION THREE

(a) Solve each of the following equations for x:

(i) $12x^2 - 5x = 2$

(ii) $x+1-\frac{3}{x}=0$

(b) Show that the graph of the function $y = 2x^2 - 5x + 6$ does not cross the x-axis.

You must use algebra to support your explanation.

c)	E rua ngā otinga tūturu o te whārite $3x^2 + kx - 12 = 0$.
	Mēnā ko tētahi o ngā otinga ko te $x = 3$, whiriwhiria tērā atu otinga.

MĀ TE KAIMĀKA ANAKE

ASSESSOR'S USE ONLY

(c)	The equation $3x^2 + kx - 12 = 0$ has two real solutions.
	If one of the solutions is $x = 3$, find the other solution.

aumou, e kore e ōrite mō tētahi tau tūturu k.	

can never be equal for a	the equation $x^2 + 2(k+1)x - (k^2 + 2k + 5) = 0$, where k is a const any real number k.	

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

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

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English translation of the wording on the front cover

Level 2 Mathematics and Statistics, 2018 91261 Apply algebraic methods in solving problems

9.30 a.m. Wednesday 14 November 2018 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 2–23 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.