

Mā te kaiwhakauru me te kura e whakaoti

Ingoa: _____

NSN

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Waehere Kura

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SUPERVISOR'S USE ONLY

**RĀ 1
RĀTŪ**



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

AROMATAWAI AROWHĀNUI

Te Pāngarau me te Tauanga, Kaupae 1, 2020

91027M Te whakahāngai tūāhua taurangi hei whakaoti rapanga

Rātū 15 Mahuru 2020

Whiwhinga: Whā

Me whakamātau koe i ngā tūmahi KATOA kei roto i tēnei pukapuka. Whakaaturia ngā mahinga KATOA. KĀORE e whakaaetia ana ngā tātaitai.

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 ana te whakaaro whai pānga mā te whakamahi anake i ngā tikanga o te 'kimikimi ka tiroiro' me te 'whakautu tika noa iho', 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 tiroiro i muri mai' me 'te whakautu tika noa iho' mō te wā kotahi anake i roto i tēnei pepa, ā, kāore e whakamahia tēnei hei taunakitanga o te whakaoti rapanga.

Me mātua whakaoti te ākongā i 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 tukuna tētahi tūmahi mā ngā kupu, me whakaatu e koe te whārite e whakamahia ana hei whakaoti i te rapanga.

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.

MĀ TE KAIMĀKA ANAKE		
Paearu Paetae		
Paetae	Kaiaka	Kairangi
Te whakahāngai tūāhua taurangi hei whakaoti rapanga.	Te whakahāngai tūāhua taurangi mā te whakaaro whai pānga hei whakaoti rapanga.	Te whakahāngai tūāhua taurangi mā te whakaaro waitara hōhonu hei whakaoti rapanga.
Whakakaotanga o te tairanga mahinga <input type="text"/>		

TŪMAHI TUATAHI

- (a) Whiriwhiria te uara o $3x^2 + 8 + 2y^2 + x^2 - 2$ ina ko $x = 2$ me $y = -3$.

- (b) Whakaotihia te tōrite $3(2 - x) - 2(3x + 1) \geq 14(1 - x)$.

- (c) Whakaotihia te whārite $\frac{3}{x+2} + \frac{5}{x-4} = 2$.

QUESTION ONE

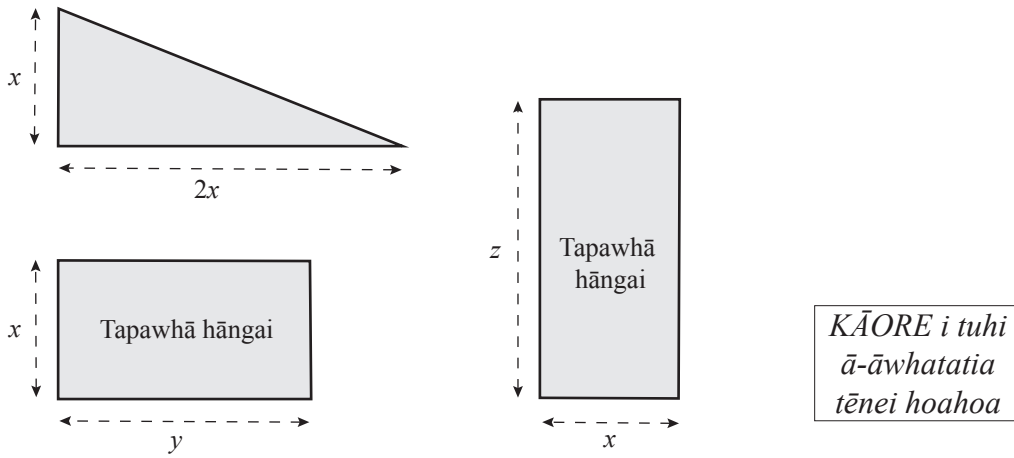
- (a) Find the value of $3x^2 + 8 + 2y^2 + x^2 - 2$ when $x = 2$ and $y = -3$.

- (b) Solve the inequality $3(2 - x) - 2(3x + 1) \geq 14(1 - x)$.

- (c) Solve the equation $\frac{3}{x+2} + \frac{5}{x-4} = 2$.

(d) Ka tātuhia e Kiri ngā hanga e toru i raro, me te whakaatu i te roa o ngā taha.

Kua tuhia ngā roa katoa ki te cm. Kia mōhio: Horahanga o tētahi tapatoru = $\frac{1}{2} \times$ pūtake \times teitei.

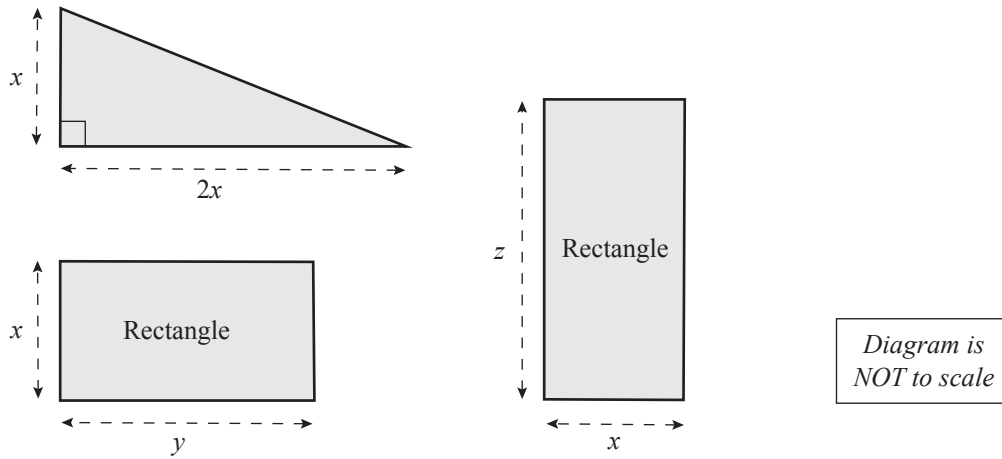


Kimihia te uara o te horahanga tapeke o ngā hanga katoa e toru, ina ko $x = 6$ cm me $x + y + z = 12$ cm.

(c) Whakaotihia te whārite $8^x \times 4^{x^2-6} = 4$.

- (d) Kiri draws the three shapes shown below, with the lengths of the sides indicated.

All lengths are in cm. Note: Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$.



Find the value of the total area of all three shapes, given that $x = 6$ cm and $x + y + z = 12$ cm.

- (e) Solve the equation $8^x \times 4^{x^2-6} = 4$.

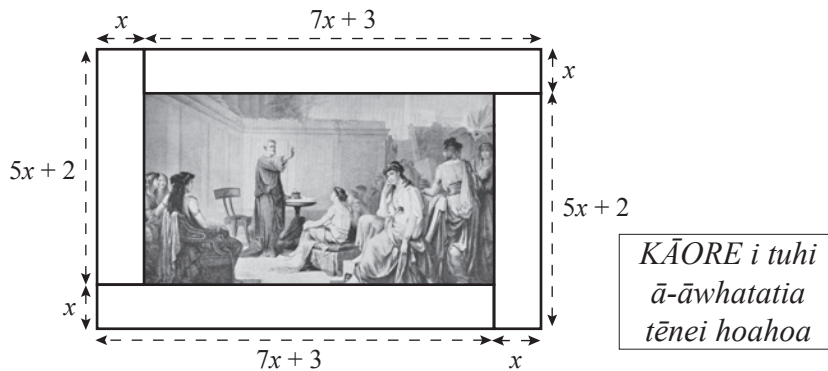
TŪMAHI TUARUA

- (a) Ka taea te tāroa o te tangata, H cm, te whakatau tata mai i te roa o tōna kikowhiti, F cm, mā te tātai $H = 3F + 100$.

Whakamahia te tātai hei kimi i te roa o te kikowhiti o te tangata, F , mēnā ko tōna tāroa, H , he 160 cm.

- (b) Kua whakamaua he tāpare mā te whakamahi i ngā papa tapawhā-hāngai e whā, e ai ki te hoahoa i raro.

Kimihia te **horahanga** o te pikitia, e ai ki te x , ka tuhi i tō whakautu ki te āhua $ax^2 + bx + c$.



- (c) Whakaotihia te tōrite $(3x - 5)^2 \leq 3x^2 + 1$.

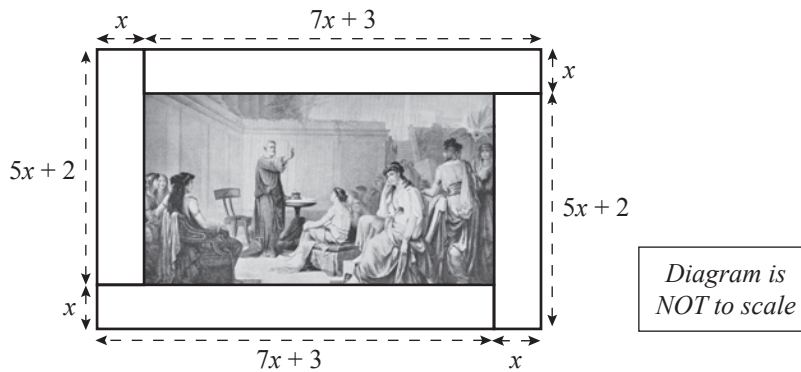
QUESTION TWO

- (a) The height of a person, H cm, can be estimated from the length of their forearm, F cm, using the formula $H = 3F + 100$.

Use the formula to find the length of a person's forearm, F , if their height, H , is 160 cm.

- (b) A picture is framed using four rectangular pieces of wood, as shown in the diagram below.

Find the **area** of the picture, in terms of x , giving your answer in the form $ax^2 + bx + c$.

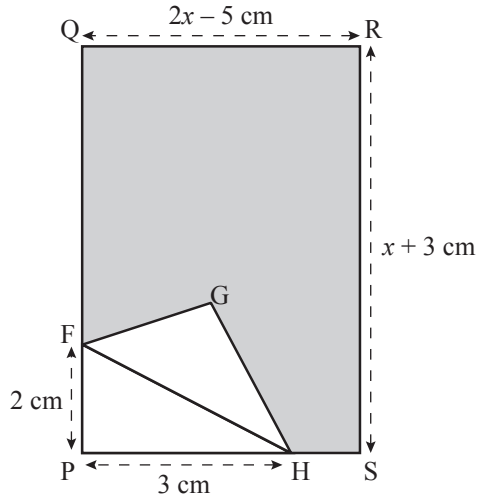


- (c) Solve the inequality $(3x - 5)^2 \leq 3x^2 + 1$.

- (d) Ka pōkaitia tētahi pepa tapawhā-hāngai, PQRS, e whakaaturia ana ki te hoahoa i raro, ki te rārangi FH, kia neke ai te P ki te G.

Ka tukuna ngā roa e whai ake: $FP = 2 \text{ cm}$, $PH = 3 \text{ cm}$, $RS = x + 3 \text{ cm}$, me te $QR = 2x - 5 \text{ cm}$.

Kia mōhio: Horahanga o tētahi tapatoru = $\frac{1}{2} \times \text{pūtaka} \times \text{teitei}$.



*KĀORE i tuhi
ā-āwhatatia
tēnei hoahoa*

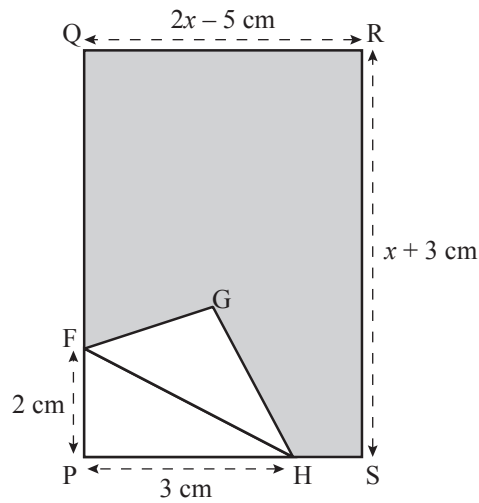
- (i) Kimihia te **paenga** o te wāhi kua kaurukutia, e ai ki a x .

- (ii) Kimihia te uara o x kia eke ai te **horahanga** o te wāhi kauruku ki te 24 cm^2 .

- (d) A rectangular piece of paper, PQRS, shown in the diagram below, is folded along the line FH, so that P is moved to G.

The following lengths are given: $FP = 2$ cm, $PH = 3$ cm, $RS = x + 3$ cm, and $QR = 2x - 5$ cm.

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



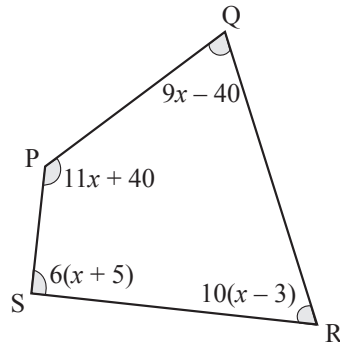
*Diagram is
NOT to scale*

- (i) Find the **perimeter** of the shaded region, in terms of x .

- (ii) Find the value of x so that the **area** of the shaded region is 24 cm².

TŪMAHI TUATORU

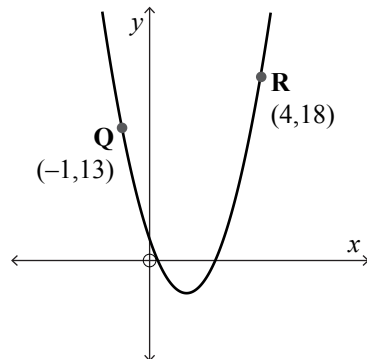
- (a) Ko te tapeke o ngā koki roto i roto i tētahi tapawhā he 360° .



*KĀORE i tuhi
ā-āwhatatia
tēnei hoahoa*

Kimihia te uara o x i roto i te hoahoa i runga ake.

- (d) E whakaatu ana te hoahoa i raro i tētahi wāhanga o te kauwhata i tātuhia, ko $y = ax^2 + bx + 2$.
E takoto ana ngā pūwāhi Q me te R ki te kauwhata i ngā taunga $(-1, 13)$ me te $(4, 18)$.

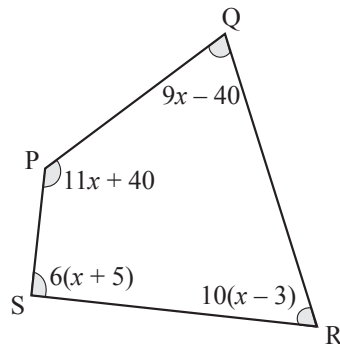


*KĀORE i tuhi
ā-āwhatatia
tēnei hoahoa*

Whiriwhiria ngā uara o ngā tau a me b .

QUESTION THREE

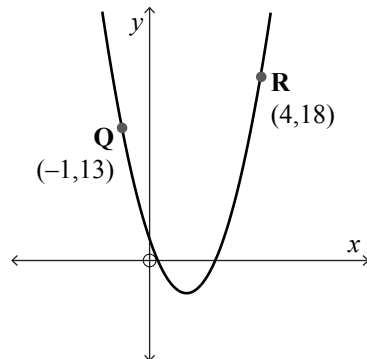
- (a) The sum of the interior angles in any quadrilateral is 360° .



*Diagram is
NOT to scale*

Find the value of x in the diagram above.

- (b) The diagram below shows a sketch of part of the graph $y = ax^2 + bx + 2$.
The two points Q and R each lie on the graph at co-ordinates $(-1, 13)$ and $(4, 18)$.



*Diagram is
NOT to scale*

Find the values of the numbers a and b .

- (c) E rima ngā tau o Teri. E whā tau te pakeke ake o Mari i a Teri.

E hia ngā tau ka pau, ina whakareatia tahitia ake ngā tau o Teri rāua ko Mari, kia eke rā anō ki te 77?

- (b) Whakarūnātia, ki tērā e tino taea ana, $\frac{4x^2 - 25}{2x^2 - x - 10}$.

- (e) Mēnā ko $y + 3 = \sqrt{\frac{c(x^2 - 7)}{p}}$, tuhia te whārite mō x e ai ki a c , p , me y .

- (c) Teri is five years old. Mari is four years older than Teri.

How many years will it take until Teri's and Mari's ages (in years) when multiplied together, make 77?

- (d) Simplify, as far as possible, $\frac{4x^2 - 25}{2x^2 - x - 10}$.

- (e) If $y + 3 = \sqrt{\frac{c(x^2 - 7)}{p}}$, give the equation for x in terms of c , p , and y .

English translation of the wording on the front cover

COMMON ASSESSMENT TASK

Level 1 Mathematics and Statistics 2020

91027 Apply algebraic procedures in solving problems

Tuesday 15 September 2020

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.

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 2–15 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.

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