910285

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, Kaupae 1, 2018

91028M Te tūhura i ngā pānga i waenganui i ngā papatau, ngā whārite me ngā kauwhata

9.30 i te ata Rātū 20 Whiringa-ā-rangi 2018
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te tūhura i ngā pānga i waenganui i ngā papatau, ngā whārite me ngā kauwhata.	Te tūhura i ngā pānga i waenganui i ngā papatau, ngā whārite me ngā kauwhata mā te whakaaro whaipānga.	Te tūhura i ngā pānga i waenganui i ngā papatau, ngā whārite me ngā kauwhata mā te whakaaro waitara hōhonu.

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.

Whakaaturia ngā mahinga KATOA.

He tukutuku kei ētahi whārangi. He wāhi mahinga tēnei māu mō te tātuhi kauwhata, hoahoa rānei, te hanga papatau, te tuhi whārite, te tuhi rānei i tō tuhinga.

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.

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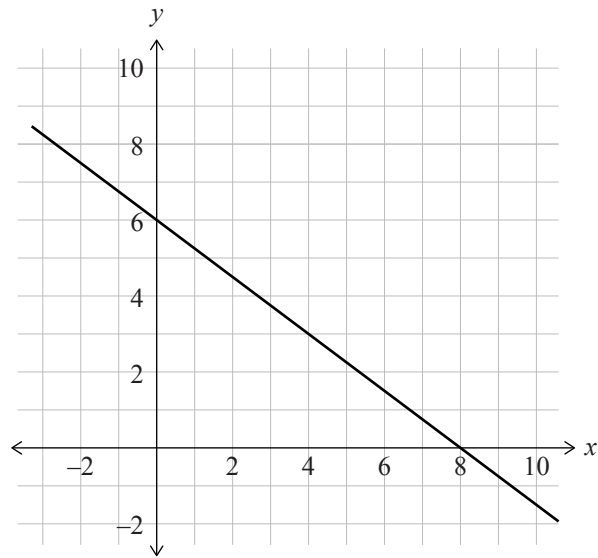
ME HOATU RAWA KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

TŪMAHI TUATAHI

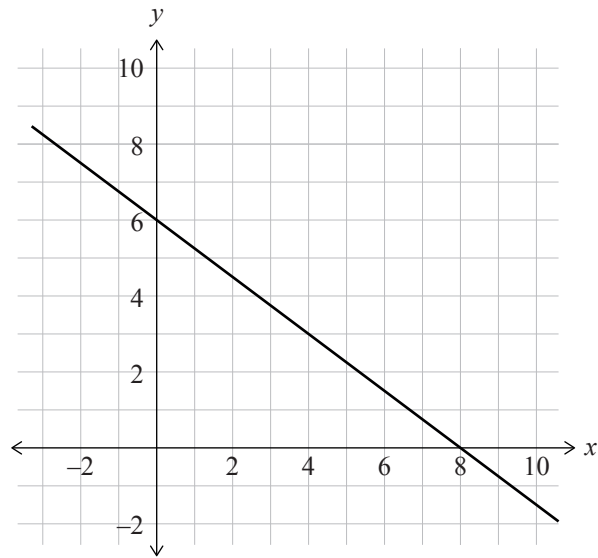(a)   Tuhia te whārite mō te kauwhata e whakaaturia ana i raro nei.

Whārite: _____

(b)   Tata ki te 40 meneti te roa e toitoi haere ana a James i te 5 km mai i tōna kāinga ki te kura.

(i)   He aha te tere toharite o James i a ia e toitoi ana mai i tōna kāinga ki te kura?

_____

_____

QUESTION ONE

(a)   Give the equation of the graph shown below.

Equation: _____

(b)   James takes 40 minutes to jog the 5 km from his home to school.

  (i)   What is James's average speed when he is jogging from his home to school?

  _____

  _____

(ii) He tawhiti atu te kāinga o Emma i tō James mai i te kura.

He ōrite te wā e wehe ai rāua i ō rāua kāinga.

Ka haere a Emma mā runga i tōna pahikara ki te kura, ā, ka toitoi atu a James ki te kura.

Ka tūtaki rāua i te 20 meneti mai i tō rāua wehenga i ō rāua kāinga.

I muri i tō rāua tūtakitanga, ka huria e James rāua ko Emma ō rāua terenga kia ōrite ai tō rāua tere.

Ka tīmata a James ki te oma, ā, ka neke haere te pahikara o Emma ki te ¾ o tōna tere i mua i tō rāua tūtakitanga.

Ka tae atu rāua ki te kura i te 30 meneti mai i tō rāua wehenga i ō rāua kāinga.

Whakaaturia ki tētahi kauwhata te haerenga o Emma rāua ko James mai i ō rāua kāinga.
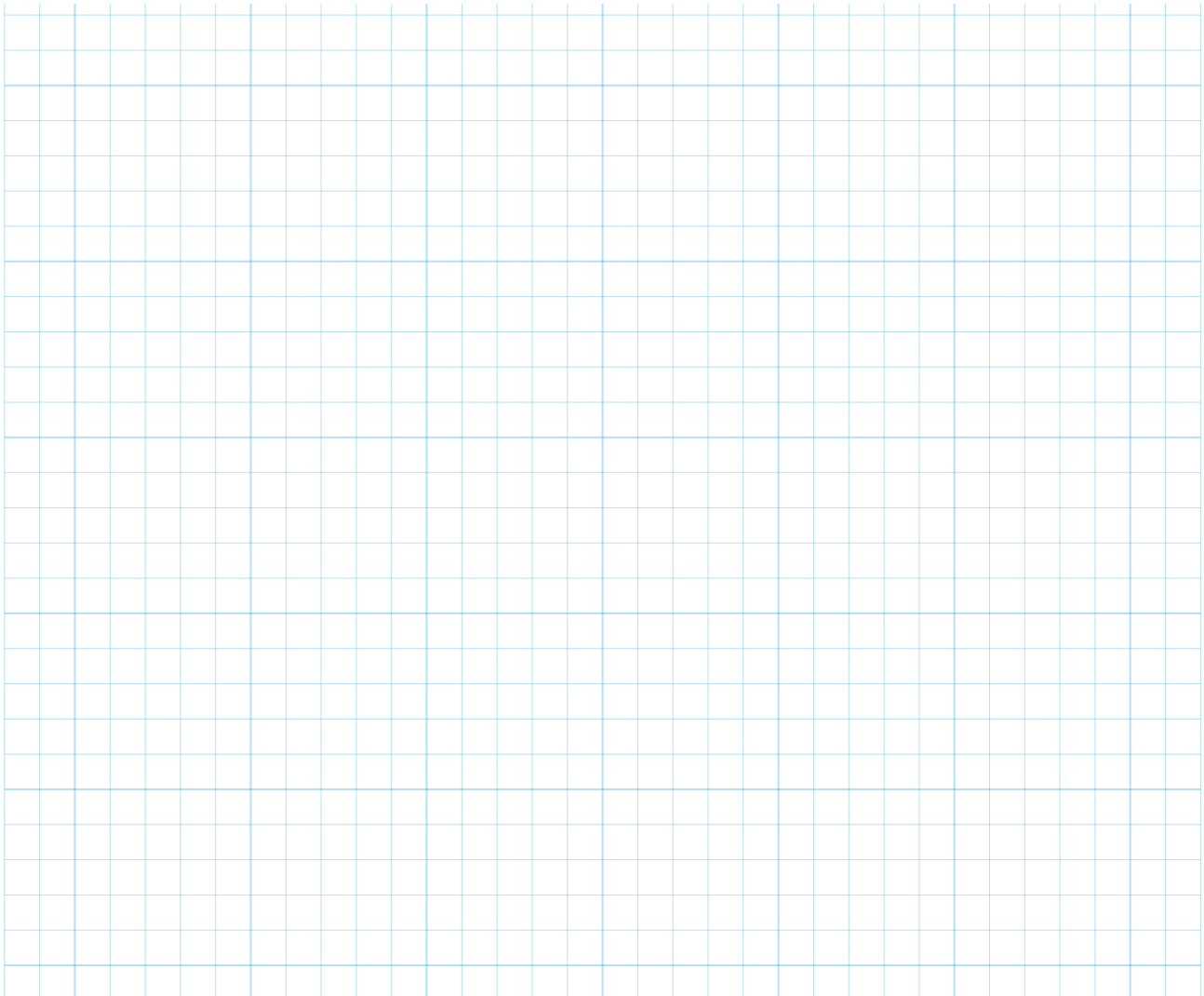
(ii)   Emma lives further away from the school than James.

They leave their homes at the same time.

Emma rides her bike to school, and James jogs to school.

They meet 20 minutes after they leave their homes.

After they meet, both James and Emma change their travelling speeds so they are the same.

James begins running and Emma rides her bike at ¾ of the speed she had been travelling before they met.

They arrive at school 30 minutes after they left their homes.

Represent Emma and James's journeys from their homes on a graph.
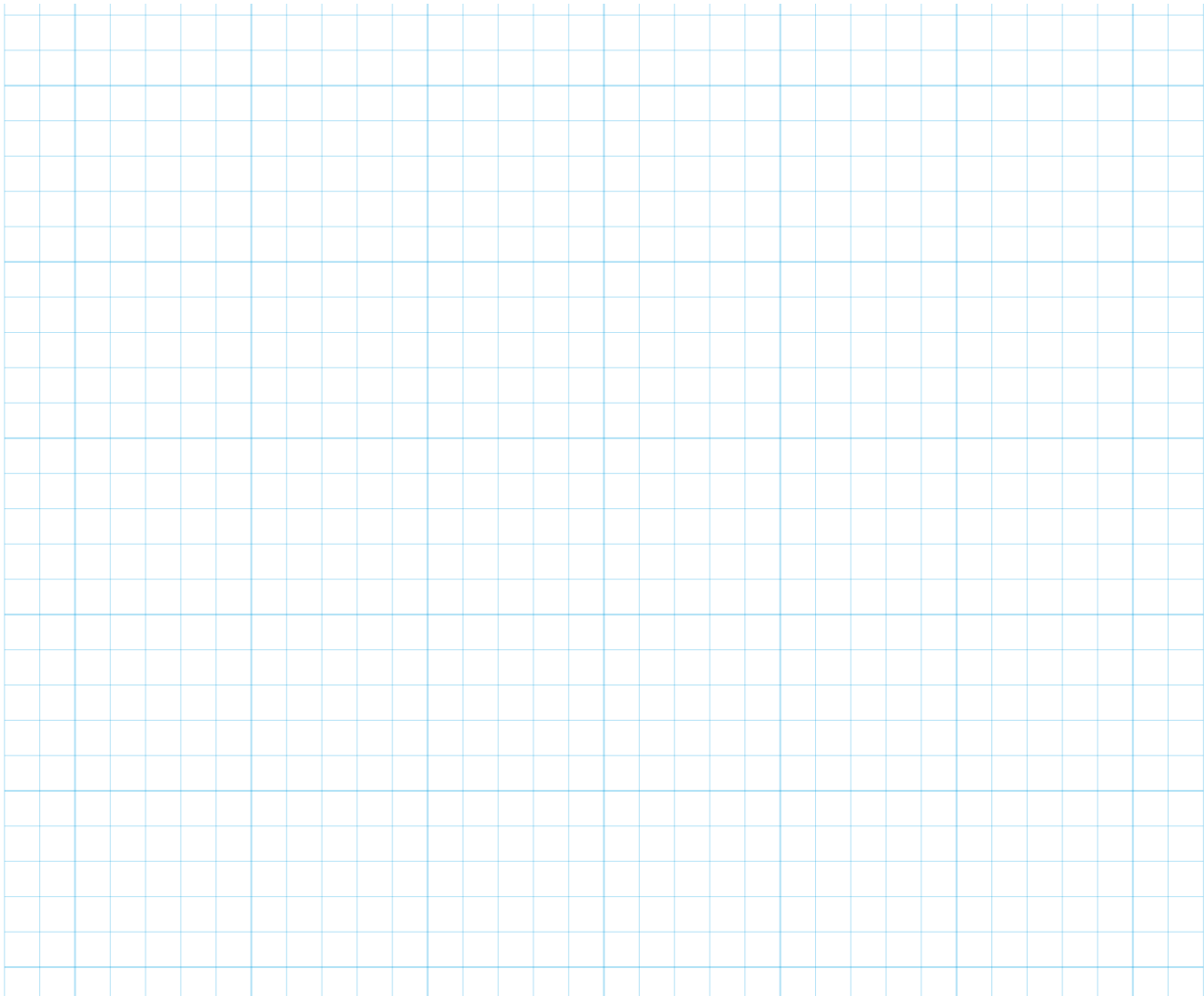
(iii)   Tuhia ngā whārite e whakaatu ana i ngā haerenga o Emma rāua ko James.

(iv)   Whakaahuahia ngā haerenga o Emma rāua ko James ki te kura, me ō rāua tere, ā, e hia te tawhiti o te kāinga o Emma mai i te kura.
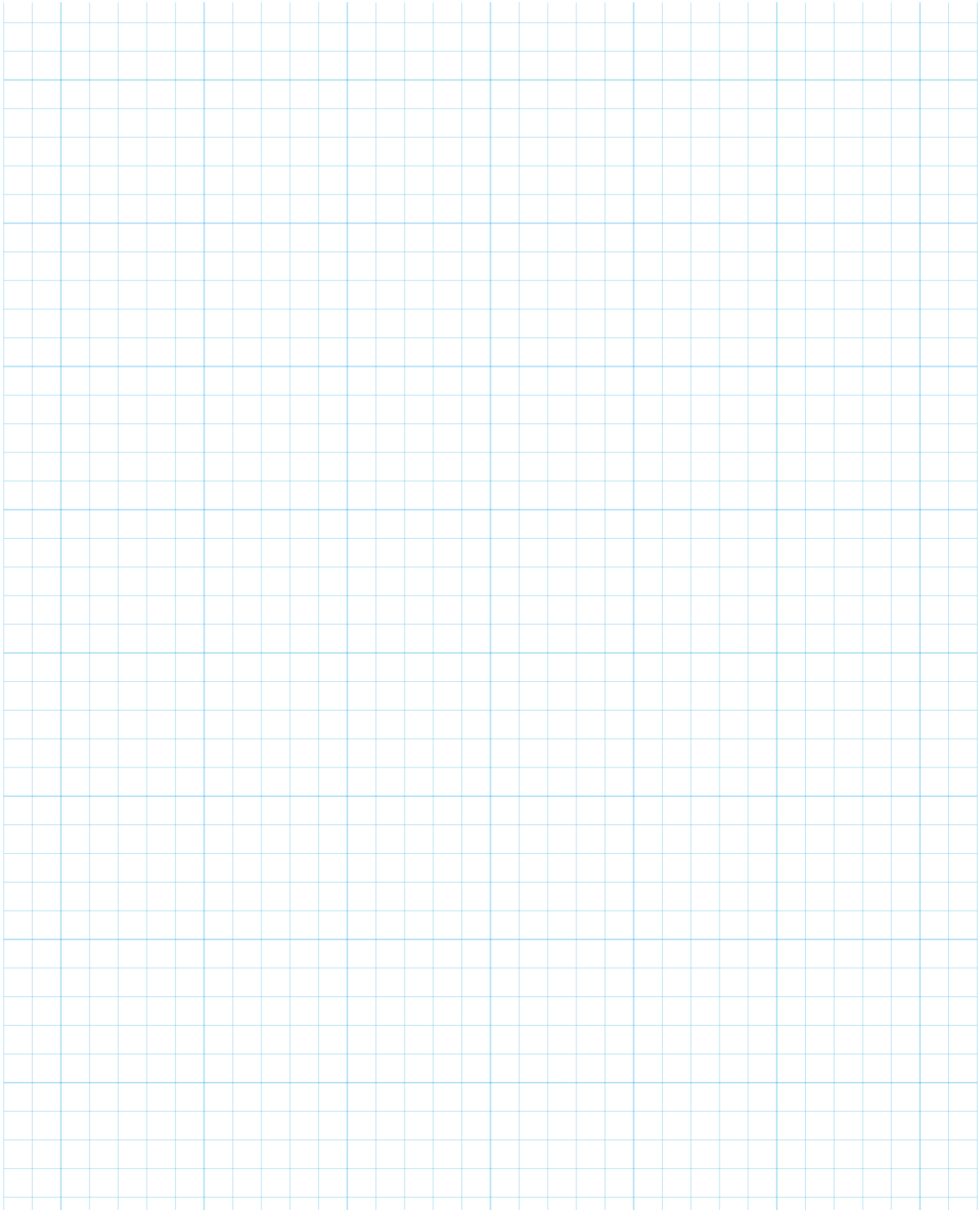
(iii) Give the equations that represent Emma's and James's journeys.

(iv) Describe Emma's and James's journeys to school, including their speeds and how far Emma's home is from the school.
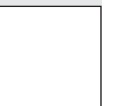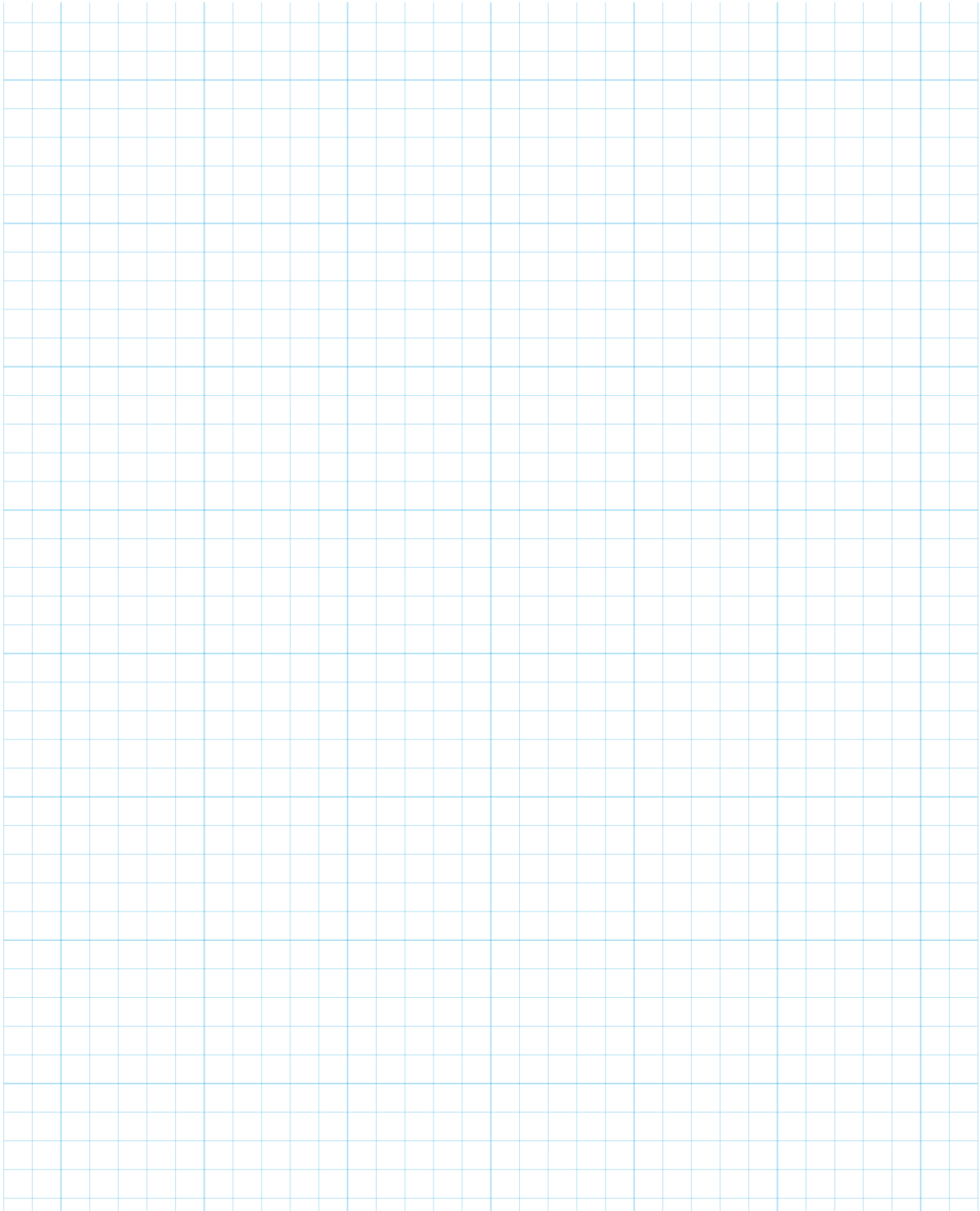
TŪMAHI TUARUA

(a) (i)   Tuhia te kauwhata o $y = 2^{(x+1)}$ ki te tukutuku i raro.

(ii)   Mēnā i nekehia tēnei kauwhata i ngā wae e toru ki te taha matau me ngā wae e whā ki runga, tuhia te whārite o te kauwhata kua nekehia.

_____

_____

QUESTION TWO

(a)   (i)   Draw the graph of $y = 2^{(x+1)}$ on the grid below.

(ii)   If this graph was moved 3 units to the right and 4 units up, give the equation of the translated graph.

_____

_____

(b) Ka hōrapa tētahi wheori[1] puku puta noa i te kura.

Ka tuhia te maha **tapeke** o ngā ākonga rerekē i haere ki te nēhi i te kotahi wā i te iti rawa nā te wheori puku. Kotahi anake te tuhinga o te ingoa o ia ākonga.

Ka taea te maha **tapeke** o ngā ākonga i tuhia ō rātau ingoa te whakatauira mā te:

$$y = 2^n + 3$$

ina ko n te maha o ngā rā mai i te haerenga atu o ngā ākonga tuatahi ki te nēhi me te wheori puku.

(i) E hia **atu anō** ngā ākonga i haere ki te nēhi mō te wā tuatahi i te rā tuawhā tēnā i te rā tuatoru?

Whakaaturia ō mahinga katoa.

(ii) Tuhia te whārite e whakaatu pai rawa i te **tokomaha** o ngā ākonga i tuhia he haere atu nō rātau ki te nēhi **ahakoa te rā** n, ina ko $n > 1$.

Homai tō tuhinga ngāwari rawa.

Whārite:

(b) A stomach bug spreads through a large school.

The **total** number of different students who go to the nurse at least once because of the stomach bug is recorded. Each student's name is recorded only once.

The **total** number of students whose name has been recorded can be modelled by:

$y = 2^n + 3$

where n is the number of days since the first students visit the school nurse with the stomach bug.
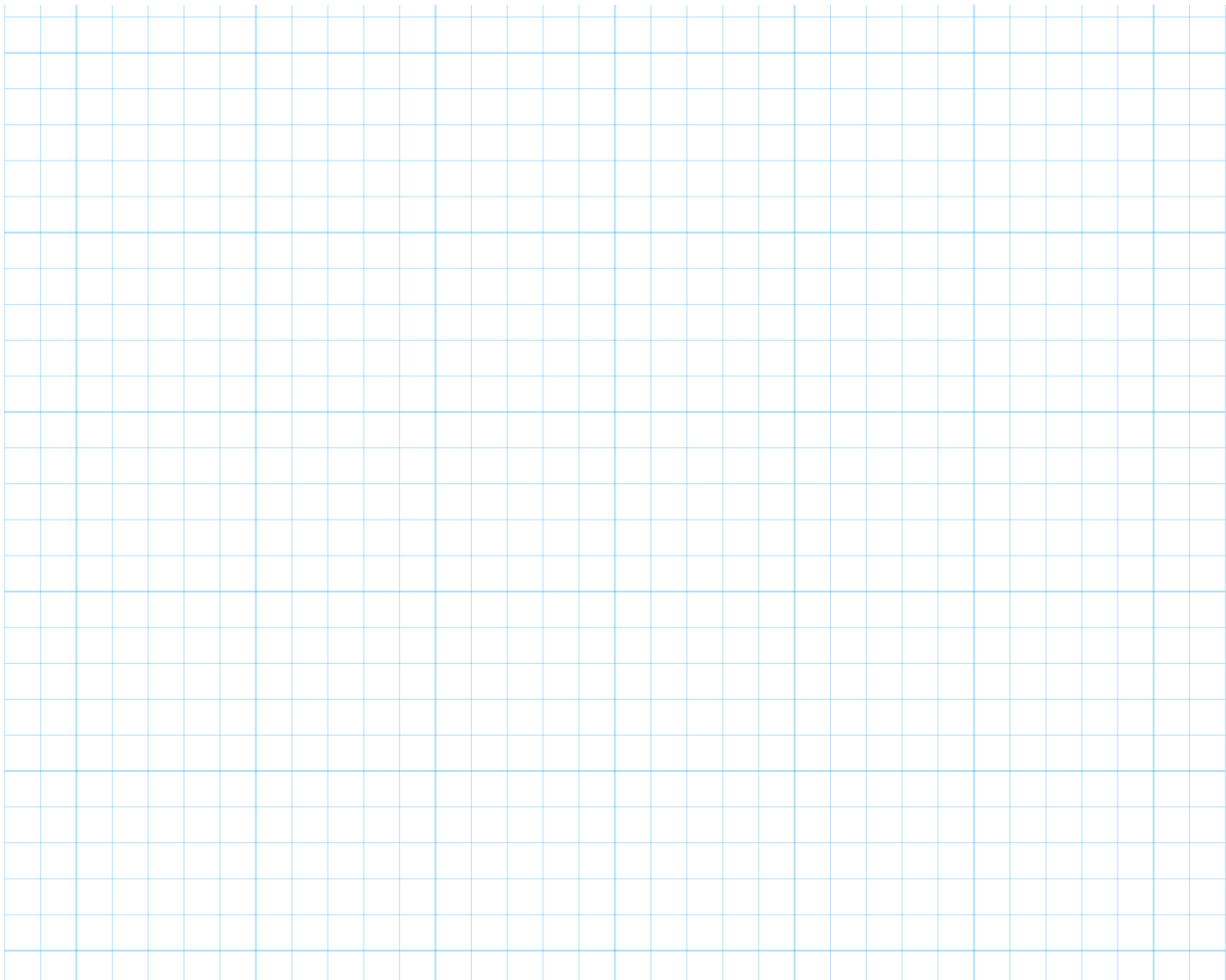
(i) How many **more** students visited the nurse for the first time on the fourth day than on the third day?

Show your working.

(ii) Give the equation that best represents the **number** of students who were recorded as going to the nurse **on any day** n, when $n > 1$.

Give your equation in the simplest form.

Equation: _____

(iii) I muri i te ekenga o te maha **tapeke** o ngā ākonga rerekē i haere ki te nēhi ki te 67, ka tīmata te heke haere i ia rā o ngā ākonga e haere ana ki te nēhi.
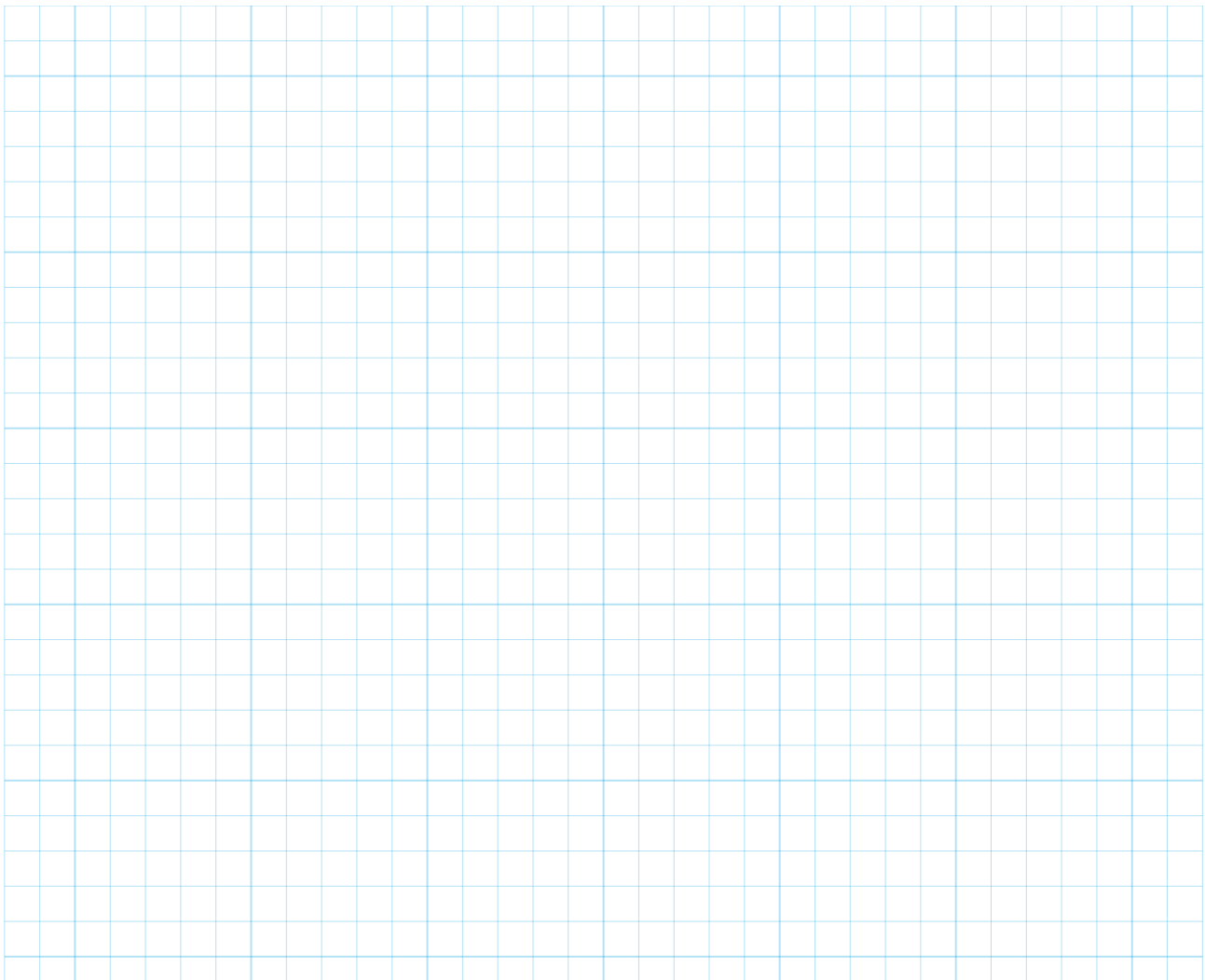
Ka taea te maha o ngā ākonga e haere ana ki te nēhi te whakatauira ināianei mā te:

$$M = -(x - 5)(x + 3) + 9$$

ina ko x te maha o ngā rā i muri i te hekenga haere o te maha o ngā ākonga e haere ana i ia rā ki te kite i te nēhi.

E hia ngā rā i muri i te haerenga atu o ngā ākonga tuatahi ki te nēhi kura me te wheori puku kua kore he ākonga e haere ana ki te nēhi kura me taua wheori puku?

Nui o ngā rā: _____

(iii) After the **total** number of different students who have visited the nurse reaches 67, the daily number of students who visit begins to decrease.
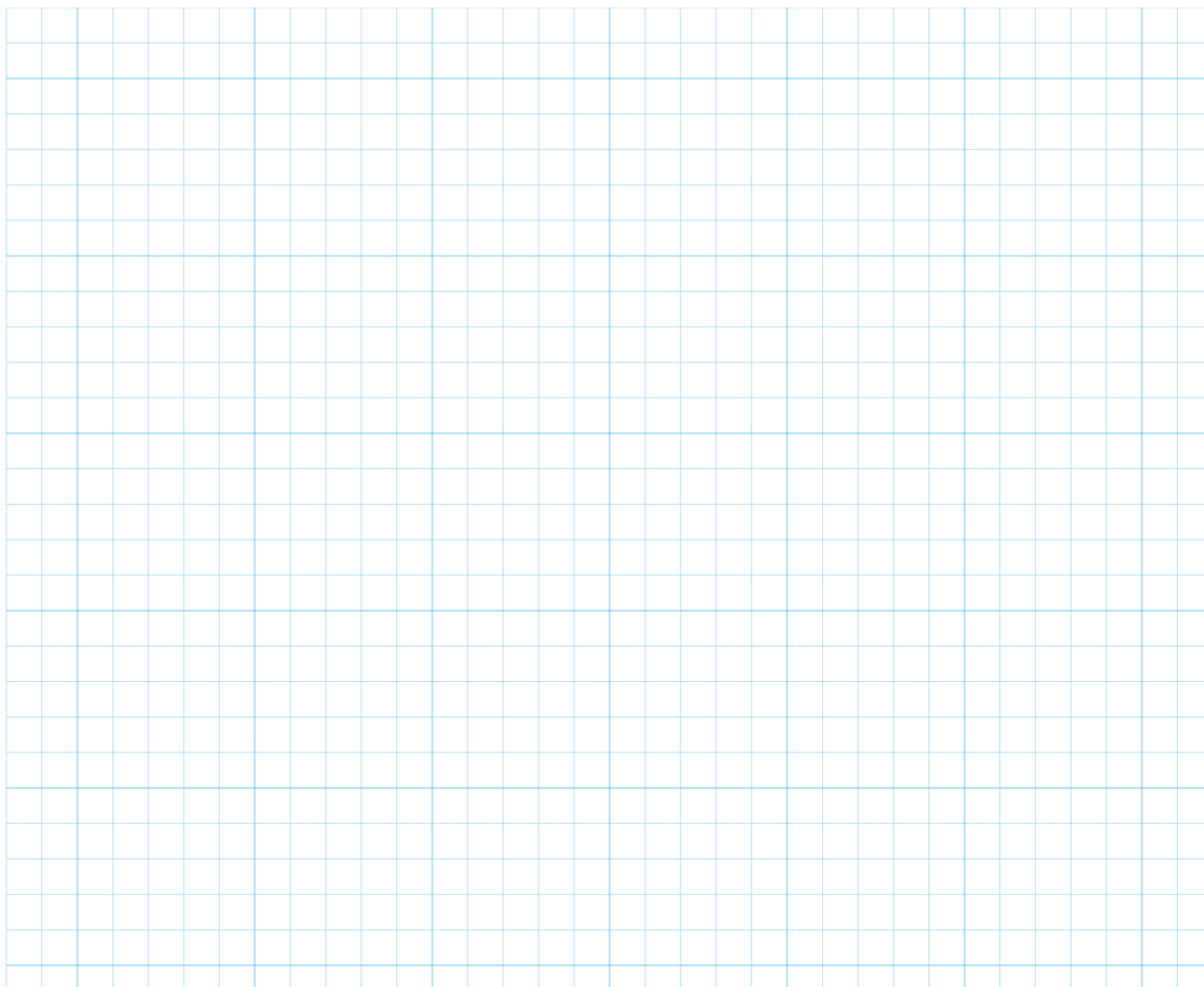
The number of different students going to the nurse can now be modelled by:

$$M = -(x - 5)(x + 3) + 9$$

where x is the number of days after the daily number of students visiting the nurse starts to decrease.
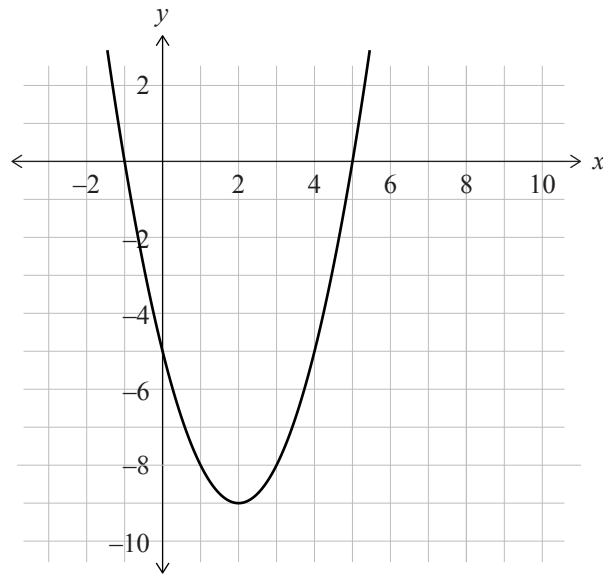
How many days after the first students went to the school nurse with the stomach bug would there be no students going to the school nurse with the same stomach bug?

Number of days: _____

TŪMAHI TUATORU

(a)   Tuhia te whārite mō te kauwhata e whakaaturia ana i raro nei.

Whārite: _____

(b)   Kei te hoahoa a Pippa i tētahi tapanga hou mō tētahi pātara inu.

E rua ngā porohita o te hoahoa, ā, kei runga ake tētahi i tētahi, e ai ki te hoahoa.

Me 10 cm te teitei mōrahi o ngā porohita e rua.

Ko te whitianga iti rawa o tēnā porohita, o tēnā porohita he 2 cm (he 1 cm i te iti rawa te pūtoro).

He whero te tae o te porohita o raro, ā, he kikorangi te mea i runga.

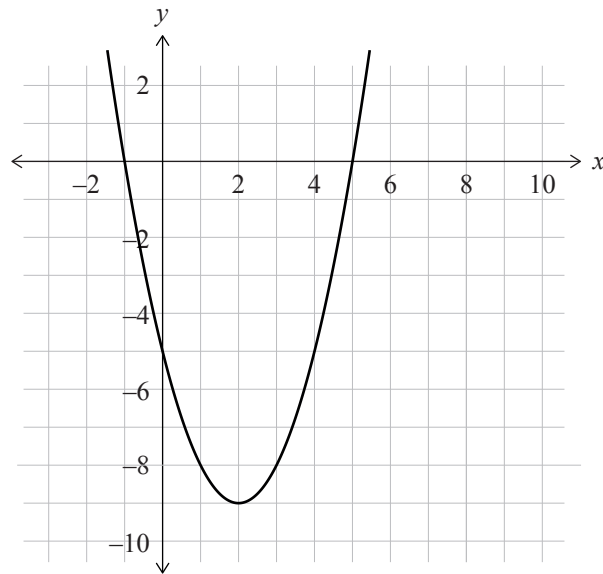Kei te hiahia a Pippa ki te mōhio i te horahanga āwhiwhi o ia porohita.

Kia maumahara ko $A = \pi r^2$.

Ka whakamahia e Pippa te π hei 3.

Tētahi hoahoa   Tētahi atu hoahoa
moko ka taea   moko ka taea
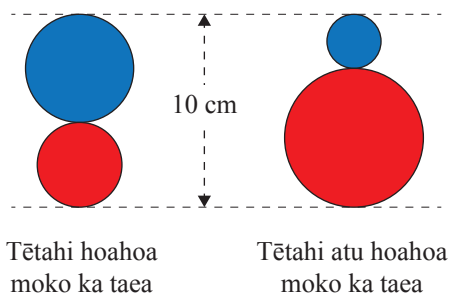
QUESTION THREE

(a)   Give the equation of the graph shown below.

Equation: _____

(b)   Pippa is designing a new label for a drink bottle.

The design is made up of two circles placed one on top of the other as shown in the diagram.

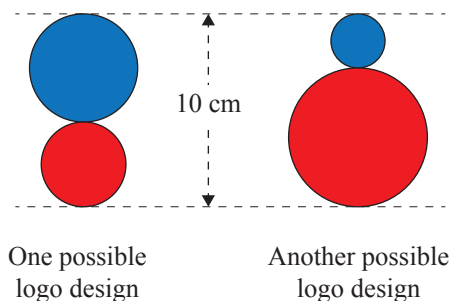The maximum height of the two circles is to be 10 cm.

The minimum diameter of either circle is 2 cm (radius is at least 1 cm).

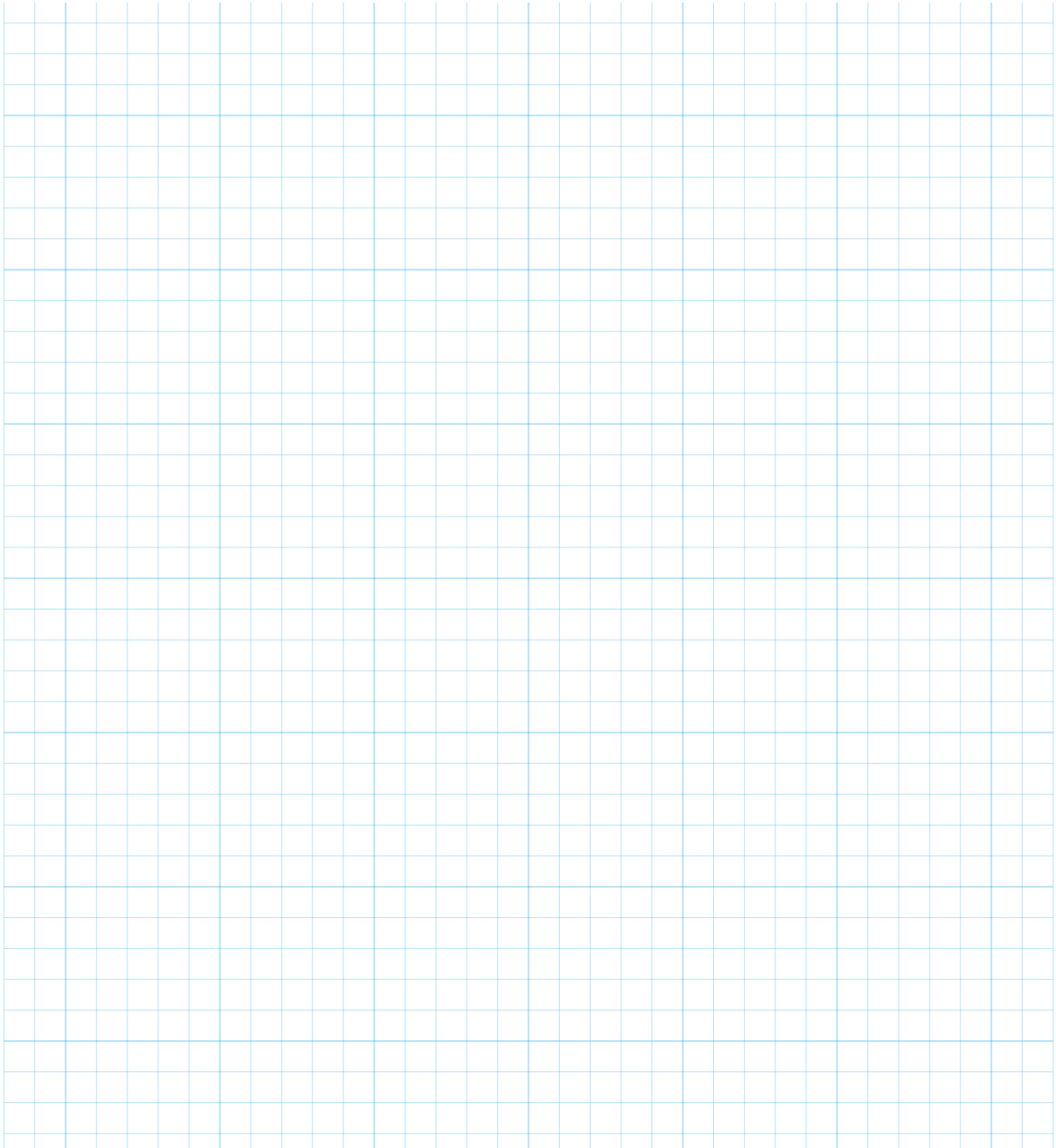The bottom circle is coloured red and the top one blue.

She wants to know the approximate area of each circle.

Remember $A = \pi r^2$.

Pippa uses π as 3.

One possible   Another possible
logo design   logo design

(i) Whakamahia he papatau, he kauwhata rānei hei tūhura i te pānga i waenga i te horahanga o te porohita whero me te pūtoro ina nui haere ake te pūtoro.

(ii) Whakaahuahia mai ngā āhuatanga matua o te kauwhata e whakaatu ana i te pānga i waenga i te horahanga o te porowhita whero me te pūtoro ina nui haere ake te pūtoro.

_____

_____

_____

_____

_____

(i)   Use a table or graph to investigate the relationship between the area of the red circle and its radius as the radius increases.
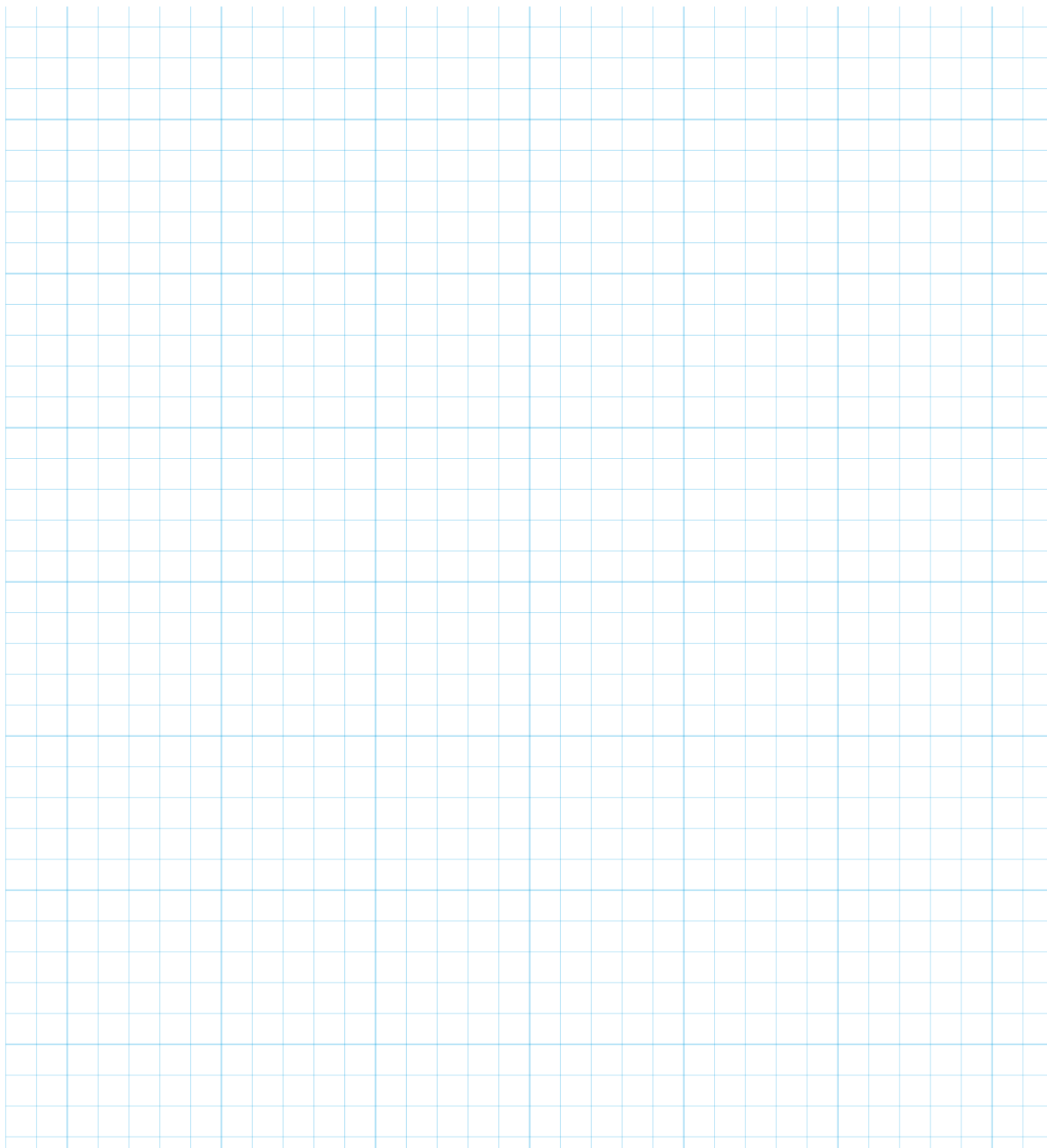
(ii)   Describe the major features of the graph that represents the relationship between the area of the red circle and its radius as the radius increases.

_____

_____

_____

_____

_____

ASSESSOR'S USE ONLY

(iii) Tuhia te whārite o te kauwhata e whakaatu ana i te **tapeke** o ngā horahanga o ngā porohita whero me te kikorangi ina huri ana ngā pūtoro.

(iv) Tuhia te whārite arowhānui o te kauwhata e whakaatu ana i te **tapeke** o ngā horahanga o ngā porohita whero me te kikorangi, ina ko te tapeke o ngā pūtoro he n cm.

(iii)   State the equation of the graph that represents the **total** of the areas of the red and the blue circles as the radii change.
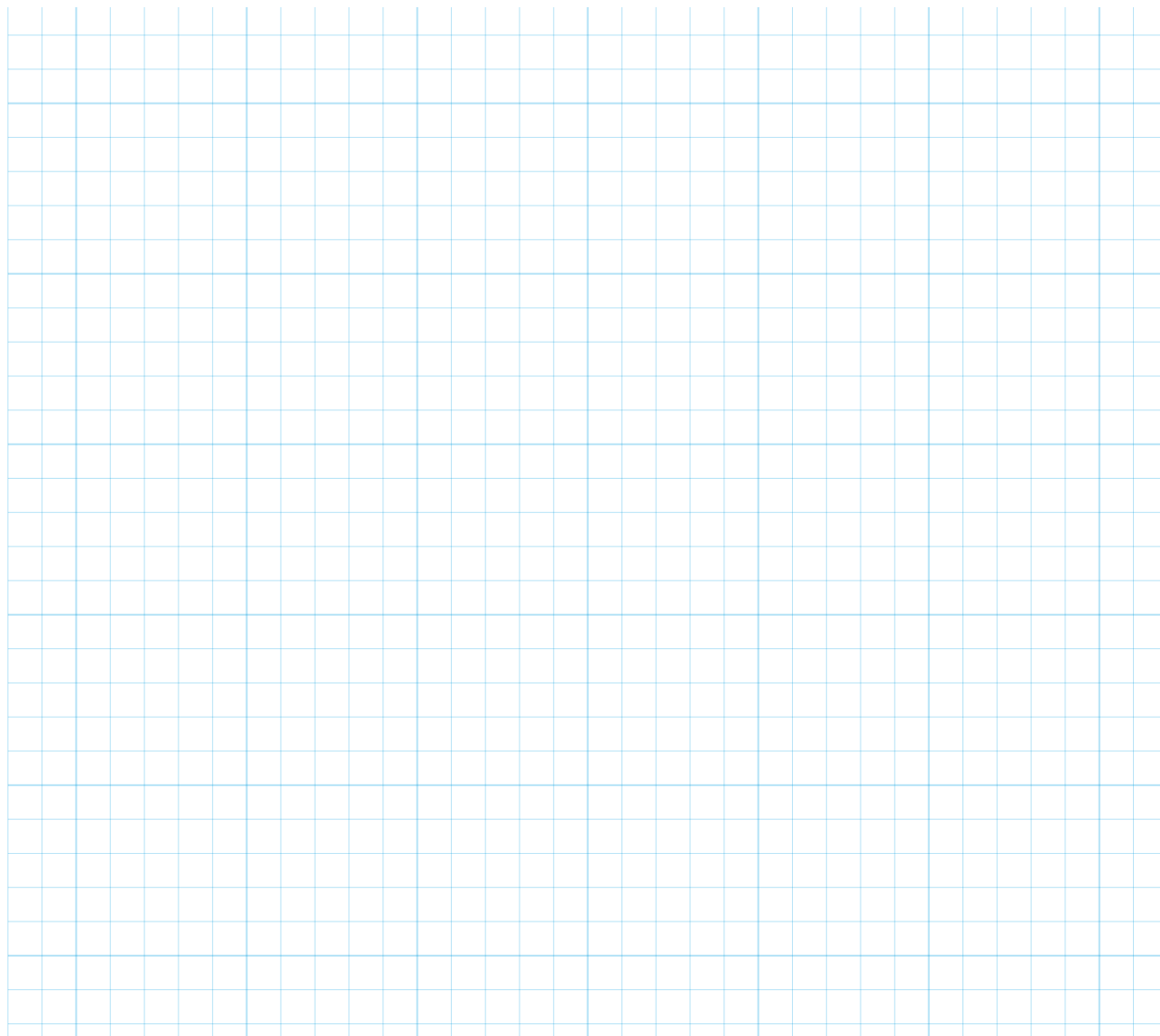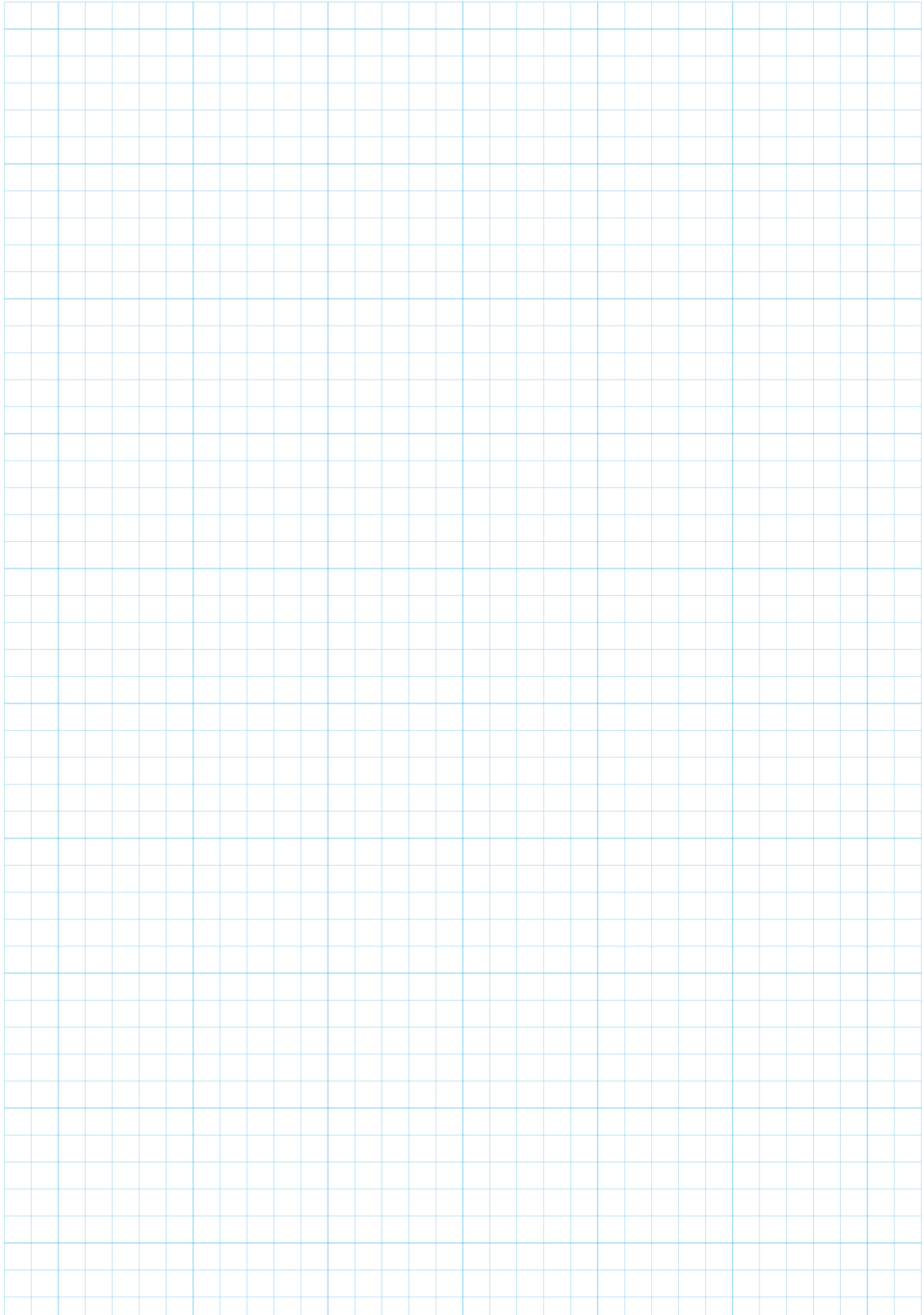
(iv)   Give the general equation of the graph which represents the **total** of the areas of the red and blue circles, where the sum of their radii is n cm.

TAU TŪMAHI

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

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

QUESTION
NUMBER

QUESTION
NUMBER

TAU TŪMAHI

TAU TŪMAHI

| | **Extra paper if required.**
Write the question number(s) if applicable. | ASSESSOR'S
USE ONLY |
| QUESTION
NUMBER | | |

Level 1 Mathematics and Statistics, 2018

91028 Investigate relationships between tables, equations and graphs

9.30 a.m. Tuesday 20 November 2018
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Investigate relationships between tables, equations and graphs.	Investigate relationships between tables, equations and graphs, using relational thinking.	Investigate relationships between tables, equations and graphs, using extended abstract thinking.

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.

Show ALL working.

Grids are provided on some pages. This is working space for the drawing of a graph or a diagram, constructing a table, writing an equation, or writing your answer.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

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.