

Tirohia te uhi o muri e kitea ai te whakapākehātanga o tēnei uhi

91947M



919475

Tuhia he (X) ki te pouaka mēnā kāore koe i tuhi kōrero ki tēnei puka

+



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Te Pāngarau me te Tauanga, Kaupae 1, 2025

91947M Te whakaatu i te tukanga whakaaro pāngarau

Ngā whiwhinga: E rima

Paetae	Kaiaka	Kairangi
Te whakaatu i te tukanga whakaaro pāngarau.	Te whakaatu i te tukanga whakaaro pāngarau mā te whakaaro ā-pānga.	Te whakaatu i te tukanga whakaaro pāngarau mā te whakaaro waitara e whānui ana.

Tirohia kia kitea ai 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 KATOĀ kei roto i tēnei pukapuka.

Tangohia Te Pukapuka Rauemi 91947MMR i te puku o te pukapuka nei.

Whakaatuhia ngā whiriwhiringa KATOĀ.

Mēnā ka hiahia wāhi atu anō koe mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka.

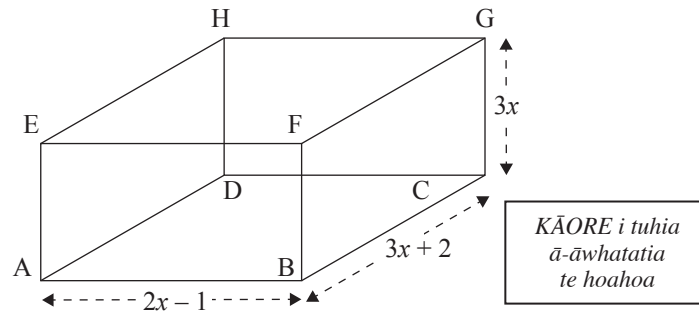
Tirohia kia kitea ai e tika ana te raupapatanga o ngā whārangi 2–27 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

Kaua e tuhi ki ngā paenga (///). Ka poroa taua wāhanga ka mākahia ana te pukapuka.

HOATU TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

TE TŪMAHI TUATAHI

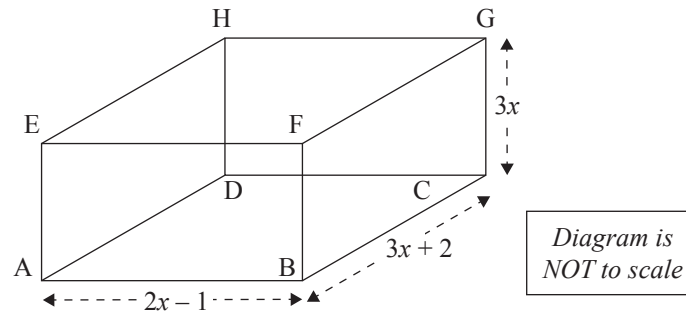
- (a) E whakaatuhia ana i te hoahoa i raro nei tētahi poro-tapawhā hāngai.



Whiriwhiria te **horahanga o ngā mata katoa** o tēnei pouaka, mehemea ko te $x = 7$.

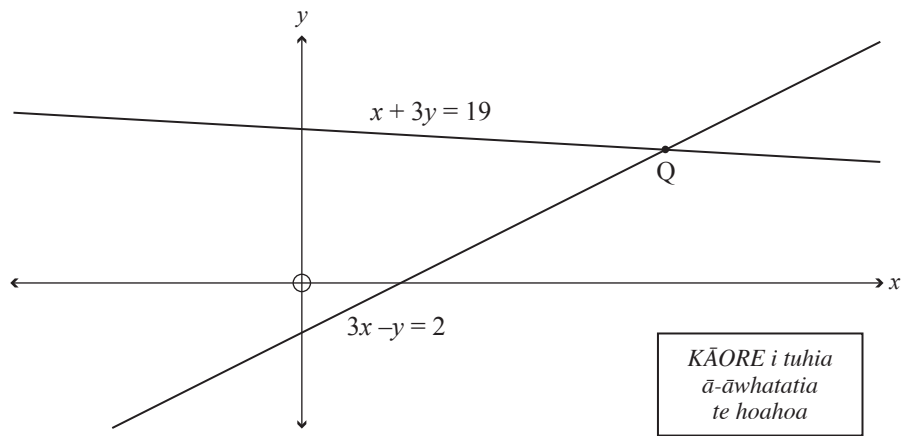
QUESTION ONE

- (a) The diagram below shows a cuboid.



Find the **total surface area** of this box, given that $x = 7$.

- Ka pūtahi ngā rārangi ki te pūwāhi Q.

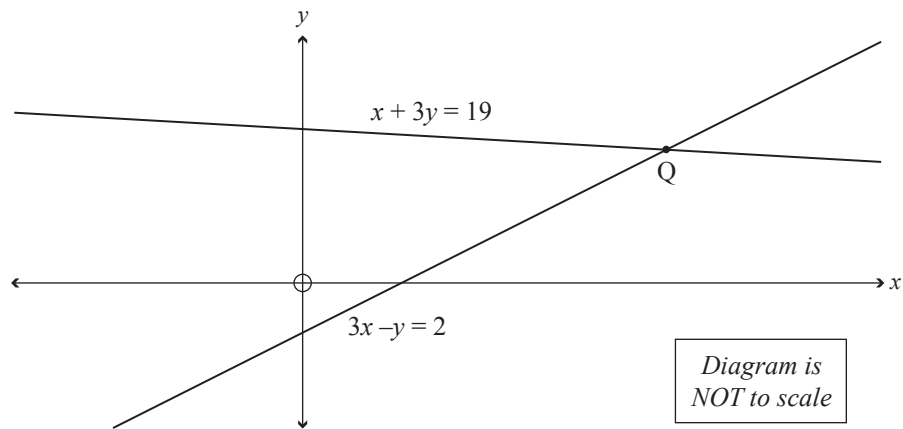


Kia mārama tō whakaatu i ngā wāhanga katoa o ō whiriwhiringa.

- (b) The graph below shows two straight lines with equations:

$$3x - y = 2 \text{ and } x + 3y = 19$$

The lines intersect at the point Q.



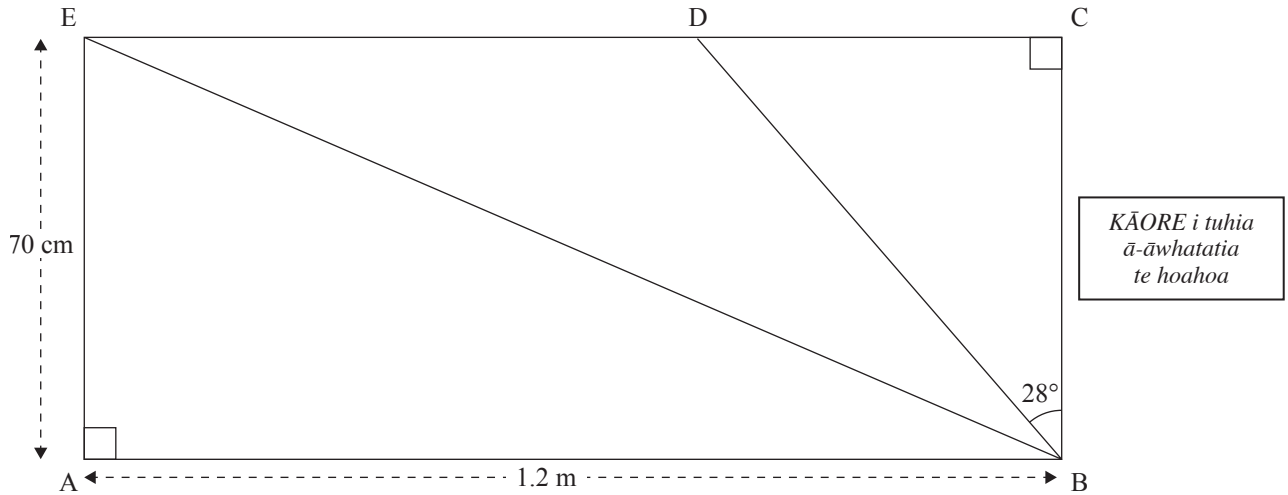
Find the coordinates of the point Q, using an **algebraic** method.

Clearly show all steps of your working.

(c) E whakaatuhia ana i te hoahoa i raro nei tētahi tapawhā hāngai ABCE.

Ko te roanga o te $AE = 70$ cm, ko te roanga o te $AB = 1.2$ m, ko te koki $CBD = 28^\circ$.

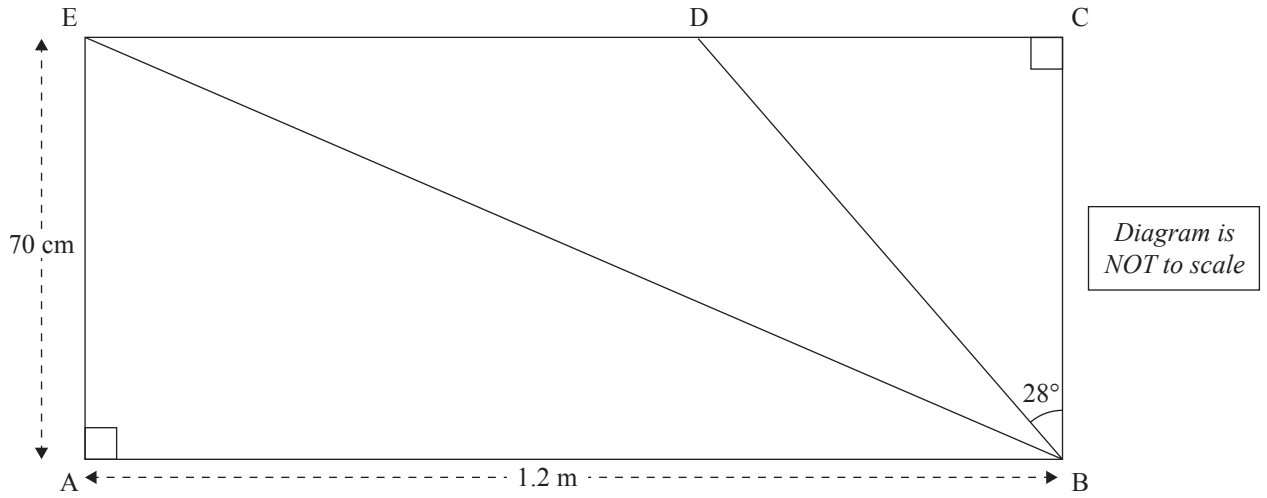
Whiriwhiria te paenga o te tapatoru BDE.



- (c) The diagram below shows a rectangle ABCE.

Length $AE = 70$ cm, length $AB = 1.2$ m, angle $CBD = 28^\circ$.

Find the perimeter of triangle BDE.



- (d) E whakaatuhia ana i te tūtohi i raro nei te pānga i waenga i ngā uara o te x me te y :

x	y
1	11
2	29
3	83
4	245
5	731

- (i) Whiriwhiria tētahi whārite e whakaatu ana i te y , ahakoa te uara o x .

Whakaatuhia ō whiriwhiringa hei taunaki i tō tuhinga.

- (d) The relationship between the x and y values in a sequence is shown in the table below:

x	y
1	11
2	29
3	83
4	245
5	731

- (i) Find an equation that represents y , for any given x -value.

Show working to support your answer.

- (ii) Ka tuhia te kauwhata o y , ka hāngai ki ngā uara katoa o x .

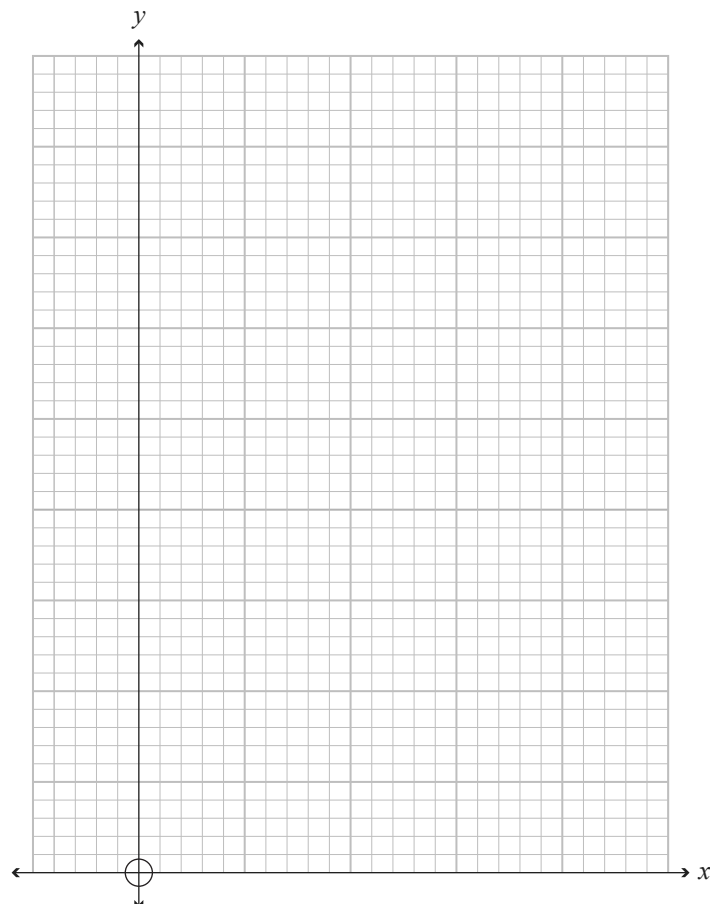
Tautuhia ngā āhuatanga rerekē e TORU o te kauwhata o y , mā te whakamahi i tō whārite i puta rā i te wāhanga (d)(i).

E āhei ana tō kōwhiri kia whakamahia te huinga tuaka i raro nei, mēnā he āwhina o roto.

Te āhuatanga 1: _____

Te āhuatanga 2: _____

Te āhuatanga 3: _____



- (ii) The graph of y could be drawn, for all values of x .

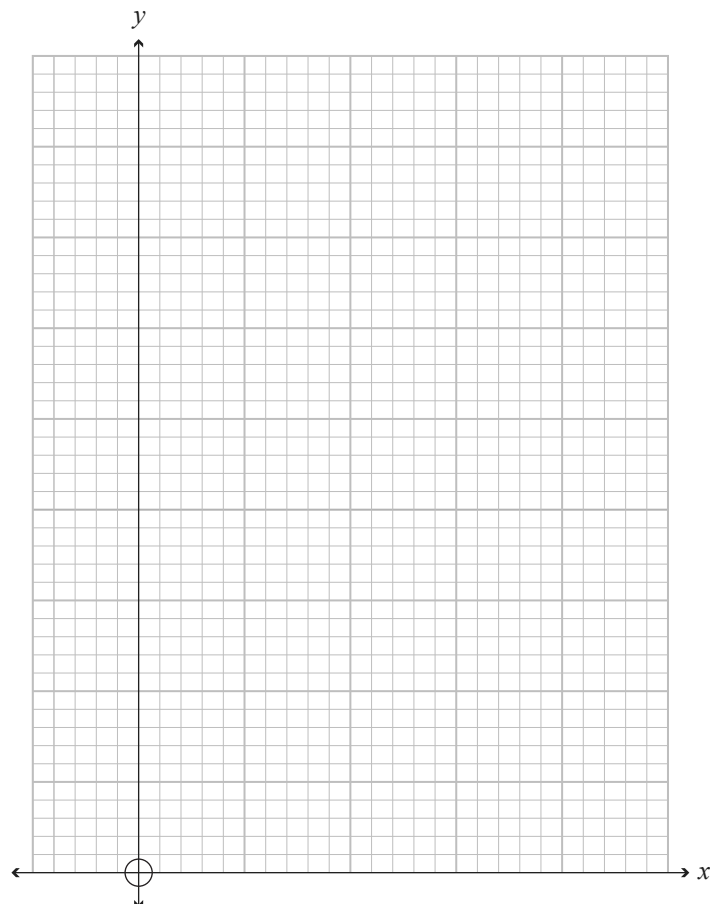
Identify THREE different features of the graph of y , using your equation found in part (d)(i).

You may choose to use the set of axes below, if it helps you.

Feature 1: _____

Feature 2: _____

Feature 3: _____

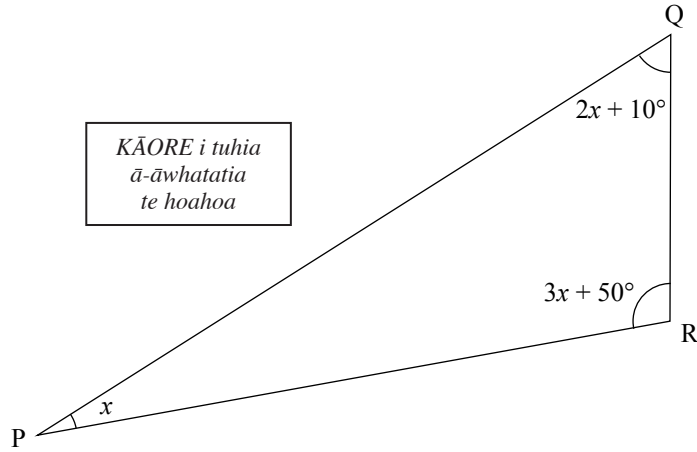


TE TŪMAHI TUARUA

- (a) E whakaatuhia ana i te hoahoa i raro nei tētahi tapatoru, arā, ko te PQR.

Whiriwhiria te uara o x .

Kia mārama tō whakaatu i ngā wāhanga katoa o ō whiriwhiringa.

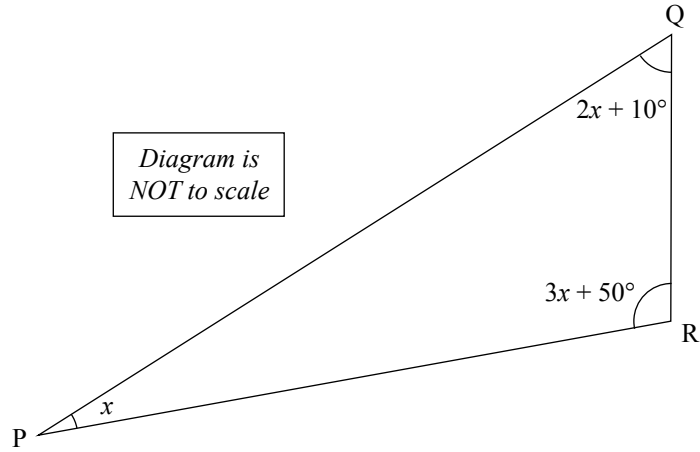


QUESTION TWO

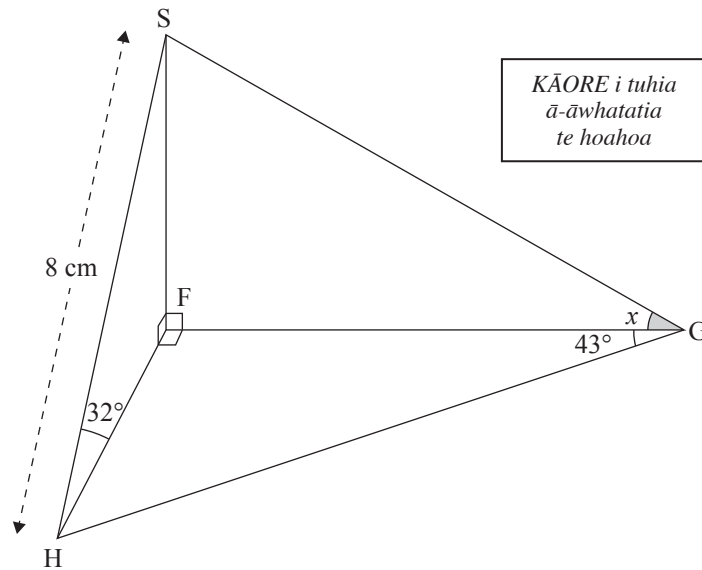
- (a) The diagram below shows a triangle PQR.

Find the value of x .

Clearly show all steps of your working.



- (b) I te hoahoa ahu-torū i raro nei, he tapatoru hāngai te tapatoru FGH, ā, ko te koki GFH = 90° . He rārangi poutū te FS, ā, e hāngai ana tērā ki te tapatoru pūtake FGH. Ko te koki SHF = 32° , ko te koki FGH = 43° , ko te SH = 8 cm.



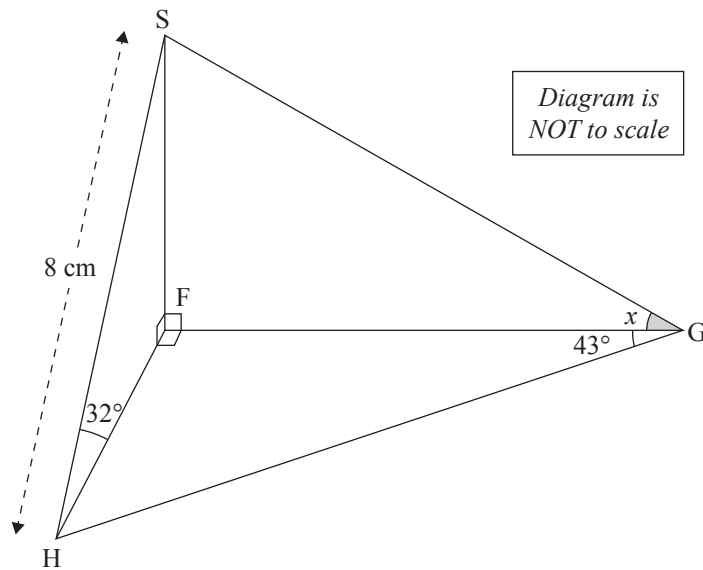
Whiriwhiria te rahi, x , o te koki SGF.

Kia mārama tō whakaatu i ngā wāhanga katoa o ō whiriwhiringa.

- (b) In the three-dimensional diagram below, triangle FGH is a right-angled triangle with angle $\text{GFH} = 90^\circ$.

Line FS is vertical and is perpendicular to the base triangle FGH.

Angle SHF = 32° , angle FGH = 43° , SH = 8 cm.



Find the size, x , of angle SGF.

Clearly show all steps of your working.

- (c) Me whakatauwehe, me whakaoti HOKI i te whārite i raro nei, mā te whakamahi i tētahi tikanga taurangi.

Homai (t)ō whakautu hei hautau rūnā.

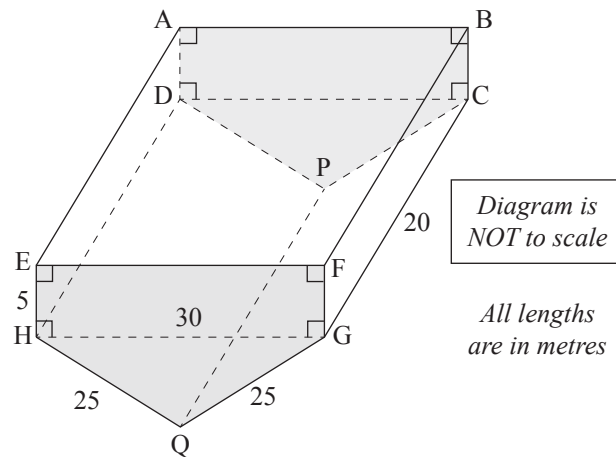
$$15x^2 = 2 - 7x$$

- (c) Factorise AND solve the equation below, using an algebraic method.
Give your answer(s) as simplified fractions.

$$15x^2 = 2 - 7x$$

- E taea ana e tētahi taraka te 45 tana o te oneone te kawē i tētahi utanga kotahi.

- (d) The diagram below shows the cross-section and plan of a large hole dug in the ground. The top section is a cuboid and the hole is symmetrical about the line PQ. All sides and the two ends (ABCPD and EFGQH) are vertical. It is known that 1 m^3 of earth weighs 800 kg. One truck is able to transport 45 tonnes of earth in one single load.



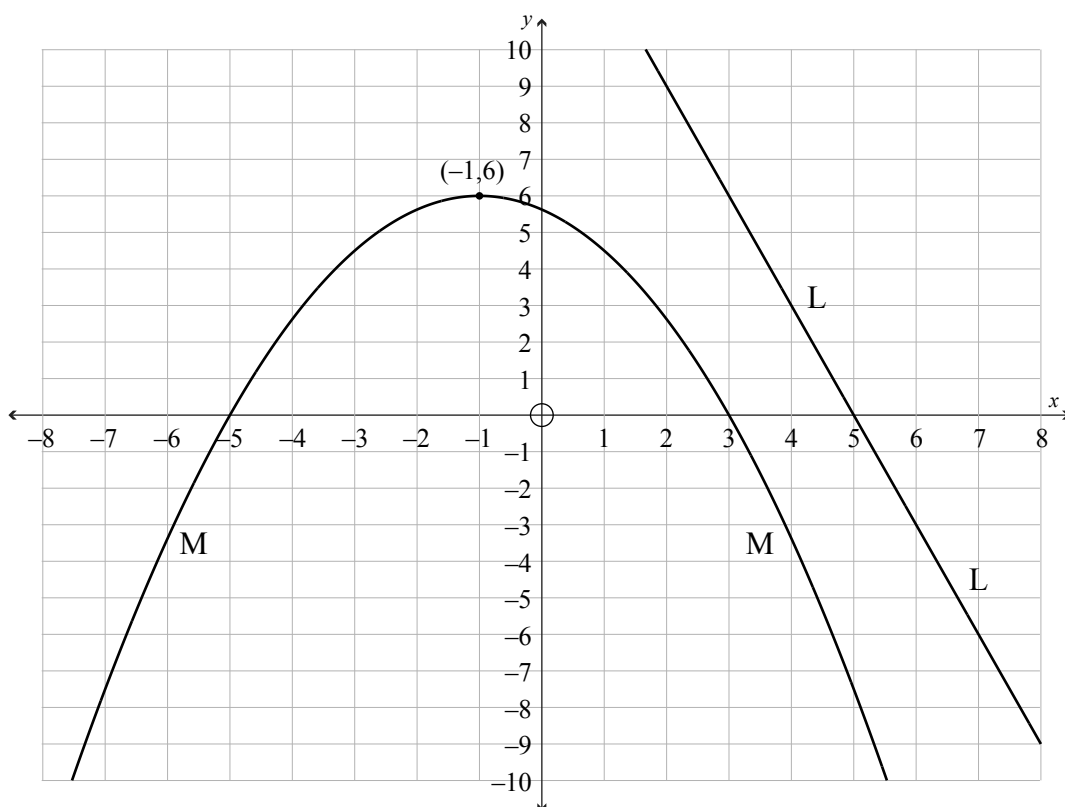
Calculate the number of truck trips required to remove all the earth from the hole.
Show full working and justify your answer.

TE TŪMAHI TUATORU

- (a) (i) Whiriwhiria te whārite o te rārangi tōtika L, e whakaatuhia ana i te hoahoa i raro nei.

- (ii) Whiriwhiria te whārite o te unahi M, e whakaatuhia ana i te hoahoa i raro nei.

Parahautia ō whiriwhiringa mā te tukanga whakaaro pāngarau e whai tikanga ana.

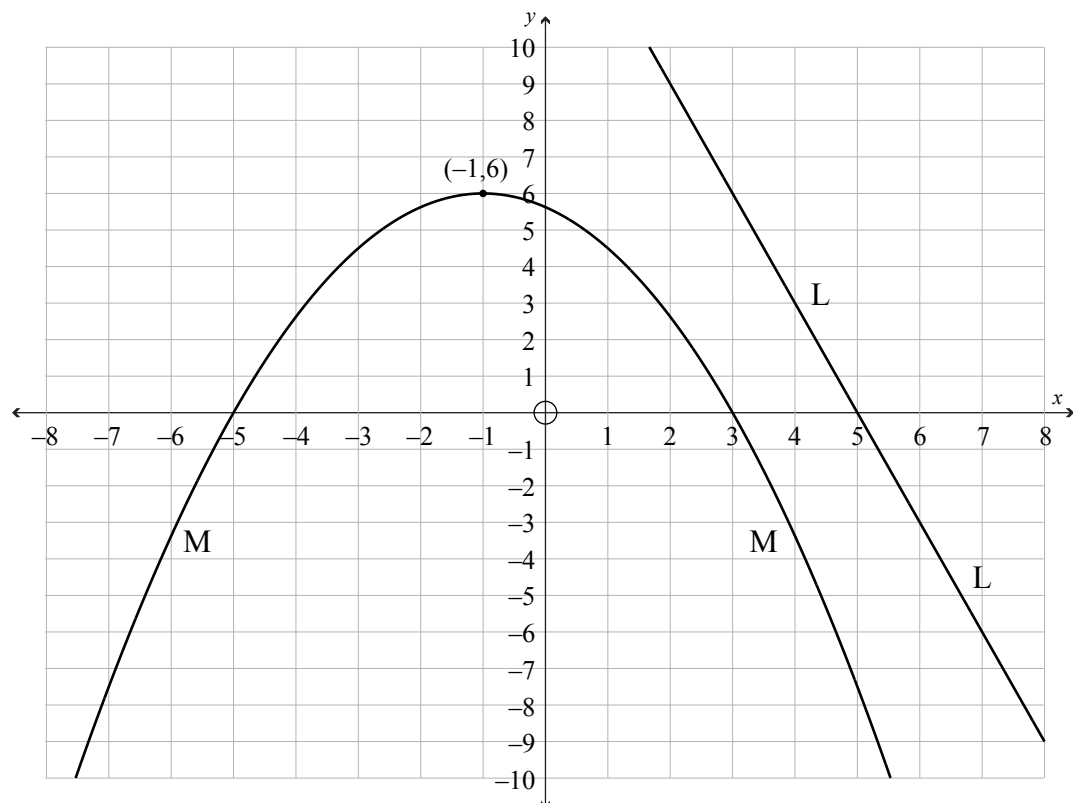


QUESTION THREE

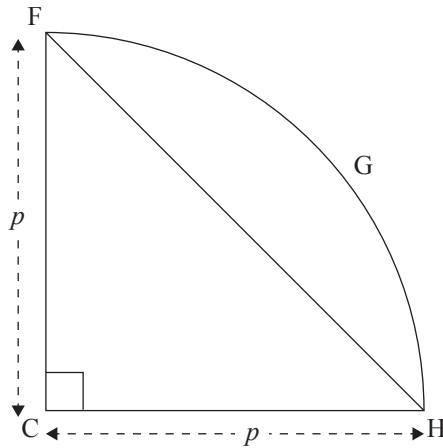
- (a) (i) Find the equation of the straight line L, shown in the diagram below.

- (ii) Find the equation of the parabola M, shown in the diagram below.

Justify your working with appropriate reasoning.



- (b) E whakaatuhia ana i te hoahoa i raro nei tētahi hauwhā o tētahi porowhita, me tōna pūtoro p , me tōna pokapū C hoki.



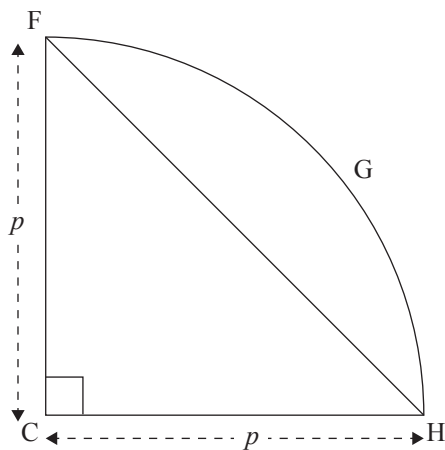
Tātaihia te roa ake o te kōpiko FGH i te rārangi tōtika FH.

Homai tō tuhinga e uru ai te p .

Kia mārama tō whakaatu i ngā wāhanga katoa o ō whiriwhiringa.

*Ka rere tonu te Tūmahi
Tuatoru i te whārangi e
whai ake nei.*

- (b) The diagram below shows a quarter of a circle, with radius p , and centre C.



Calculate how much longer the curve FGH is than the straight line FH.

Give your answer in terms of p .

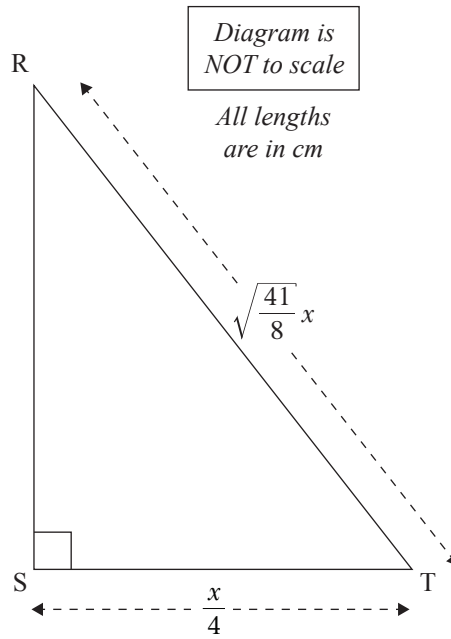
Clearly show all steps of your working.

*Question Three continues
on the next page.*

- Te Pāngarau me te Tauanga 91947M, 2025



- (c) The area of the right-angled triangle shown below is 72 cm^2 .



Find the value of x .

**He whārangi anō ki te hiahiatia.
Tuhia te tau tūmahi mēnā e hāngai ana.**

TE TAU
TŪMAHI

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

QUESTION
NUMBER

English translation of the wording on the front cover

Level 1 Mathematics and Statistics 2025
91947M Demonstrate mathematical reasoning

Credits: Five

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate mathematical reasoning.	Demonstrate mathematical reasoning with relational thinking.	Demonstrate mathematical reasoning with 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.

Pull out Resource Booklet 91947MR from the centre of this booklet.

Show ALL working.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–27 in the correct order and that none of these pages is blank.

Do not write in the margins (). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.