SUPERVISOR'S USE ONLY

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Draw a cross through the box (☒) if you have NOT written in this booklet

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NZQA | Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Mathematics and Statistics 2025

91947 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 91947R 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 2–16 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.

QUESTION ONE

(a) The diagram below shows a cuboid.

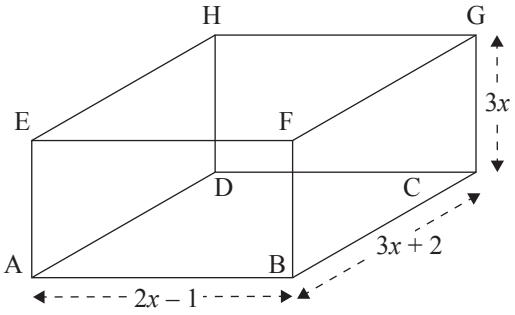


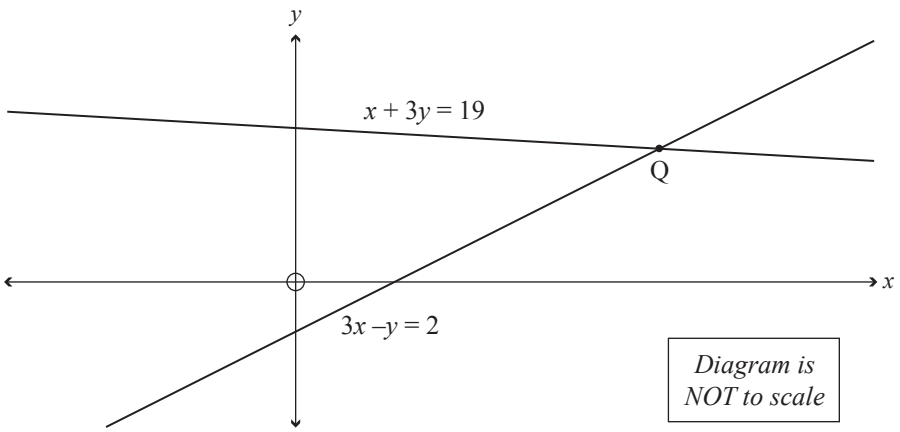
Diagram is NOT to scale

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

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

$3x - y = 2$ 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) The diagram below shows a rectangle ABCE.

Length AE = 70 cm, length AB = 1.2 m, angle CBD = 28°.

Find the perimeter of triangle BDE.

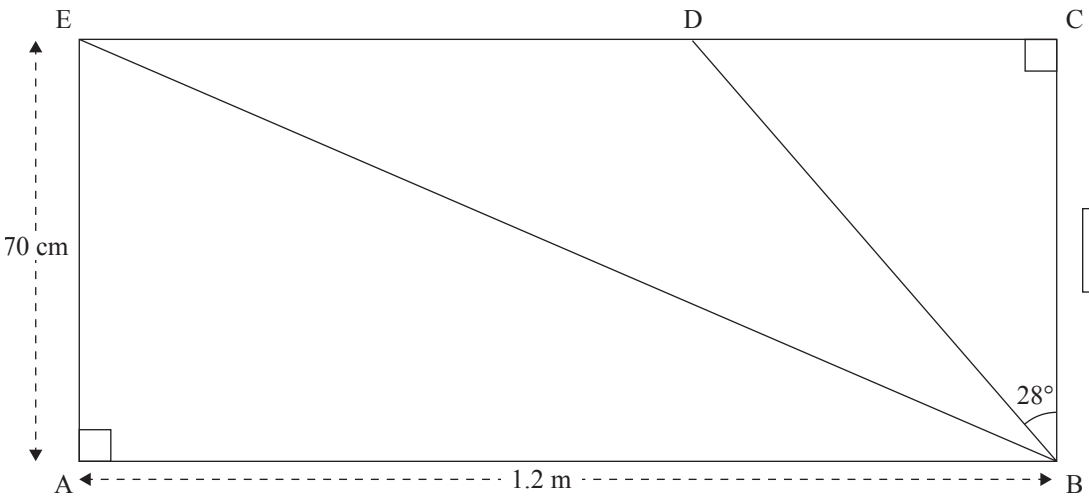


Diagram is NOT to scale

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The examination continues on the following page.

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

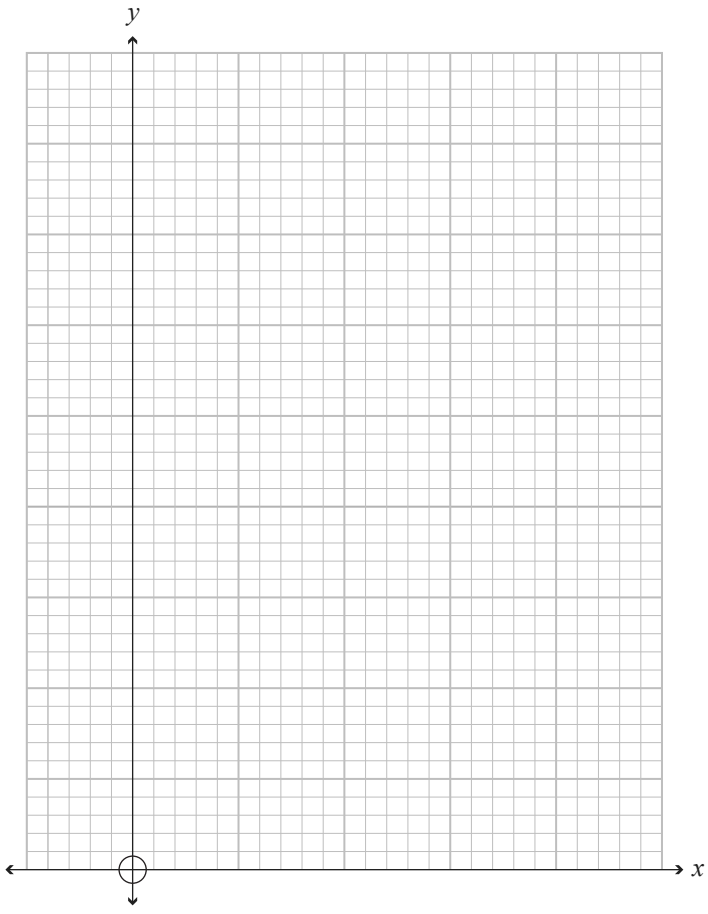
Identify THREE different features of the graph of y, using your equation found in part (d)(i).

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

Feature 1: _____

Feature 2: _____

Feature 3: _____

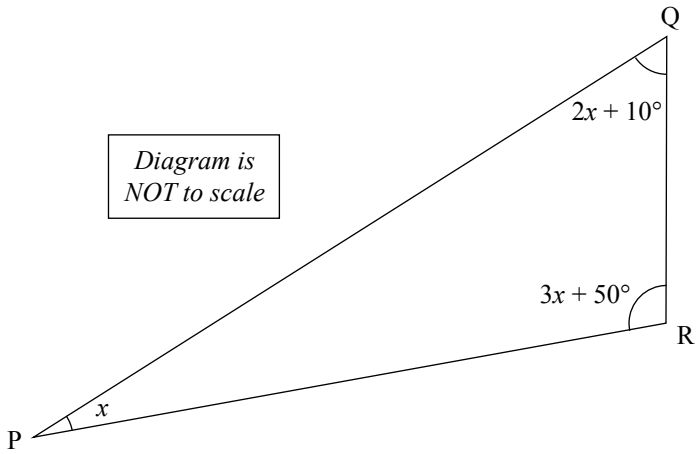


QUESTION TWO

(a) The diagram below shows a triangle PQR.

Find the value of x.

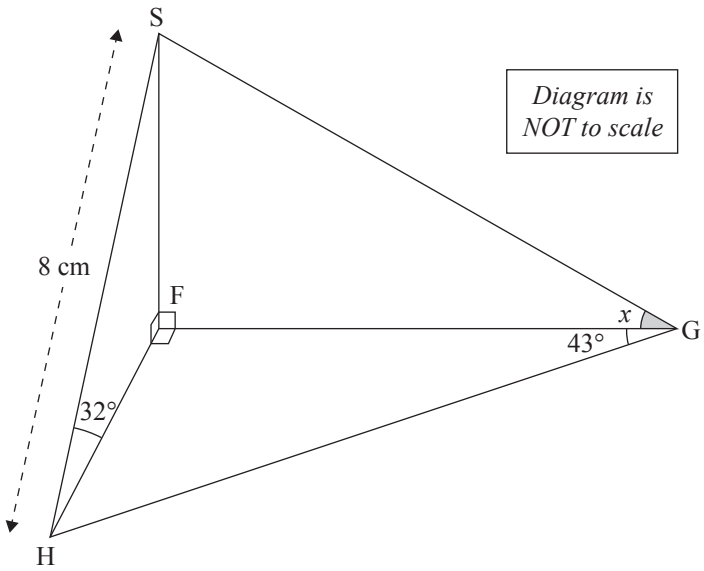
Clearly show all steps of your working.



(b) In the three-dimensional diagram below, triangle FGH is a right-angled triangle with angle GFH = 90°.

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

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



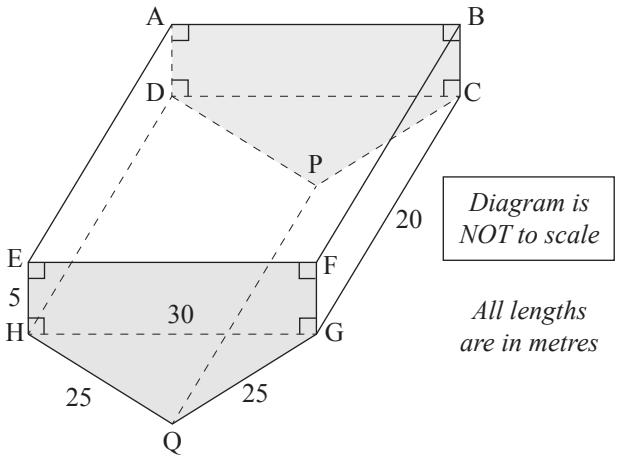
Find the size, x, of angle SGF.

Clearly show all steps of your working.

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

$15x^2 = 2 - 7x$

(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 m³ of earth weighs 800 kg.
One truck is able to transport 45 tonnes of earth in one single load.

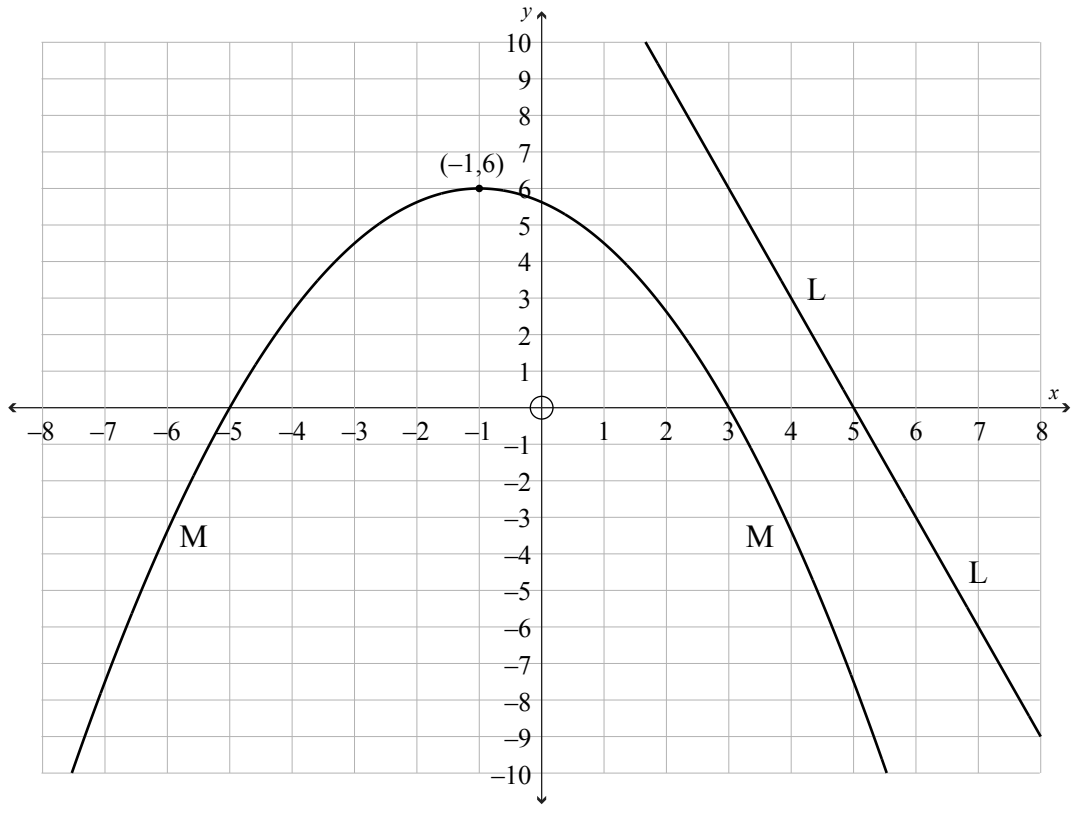


Calculate the number of truck trips required to remove all the earth from the hole.
Show full working and justify your answer.

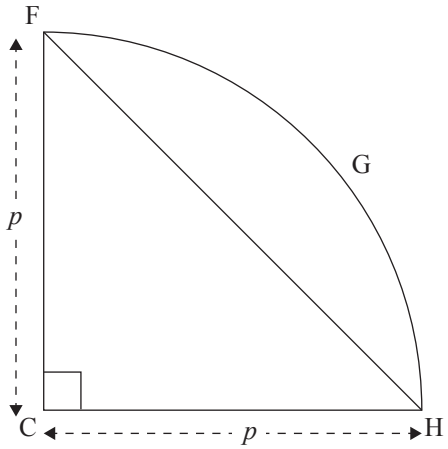
QUESTION THREE

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



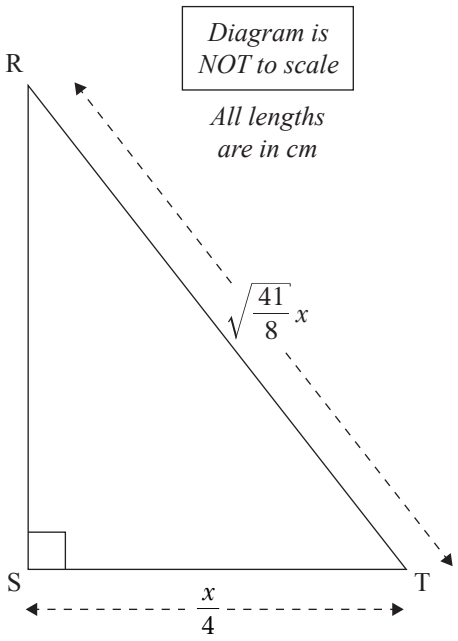
Calculate how much longer the curve FGH is than the straight line FH.

Give your answer in terms of p.

Clearly show all steps of your working.

Question Three continues on the next page.

(c) The area of the right-angled triangle shown below is 72 cm².



Find the value of x.

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

QUESTION NUMBER

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

QUESTION NUMBER