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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 2026

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.

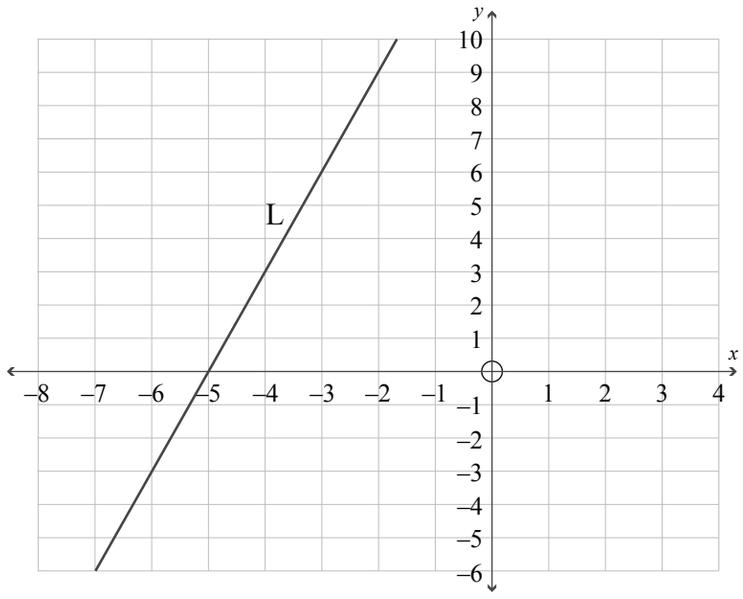
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QUESTION ONE

(a) (i) The diagram below shows a straight line L.

Find the equation of the line L.



(ii) **Use algebra** to find the **coordinates** where the line $2x + 3y - 1 = 0$ intersects with the line L.

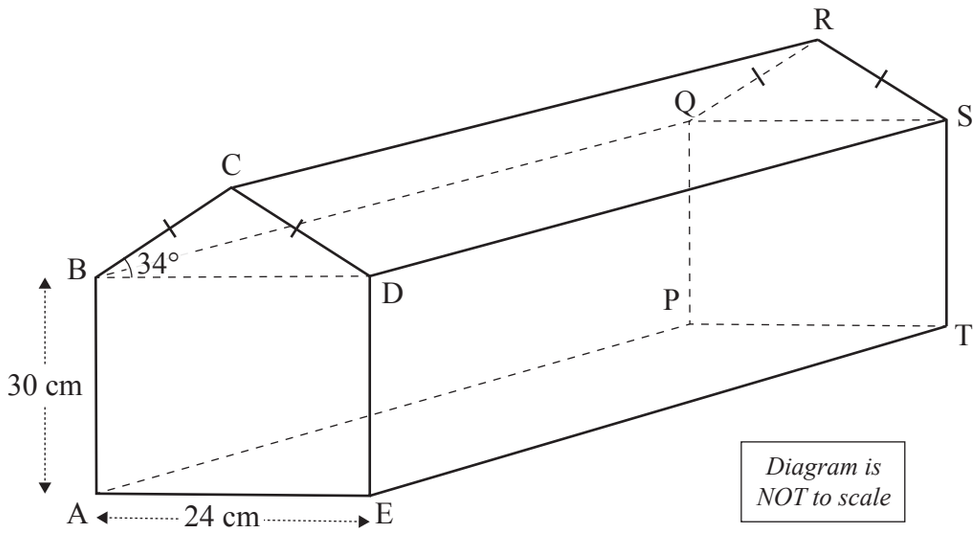
(b) The diagram below shows a three-dimensional object with volume 34 000 cm^3.

The bottom section is a cuboid.

All sides and the two ends (ABCDE and PQRST) are vertical.

Length AE = 24 cm, length AB = 30 cm, angle CBD = 34°.

Find the length ET.



(c) A solid gold cube, with length of each side 8 cm, is melted down and made into a sphere. During this process, 5% of the **volume** is lost.

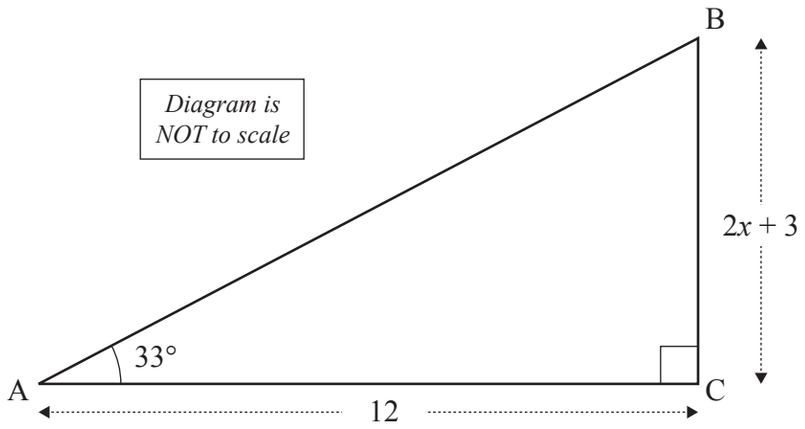
What is the percentage change in the **surface area** between the original cube and the new sphere?

QUESTION TWO

(a) In the right-angled triangle below, the angle BAC is 33°.

Length BC = $2x + 3$, length AC = 12.

All lengths are in metres.



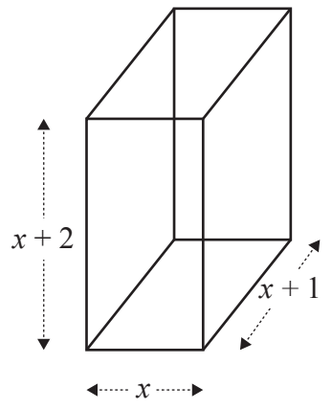
Find the value of x.

You should show your calculations to four decimal places.

(b) The cuboid shown below has **surface area** of 94 m².

All lengths are in metres.

Diagram is NOT to scale

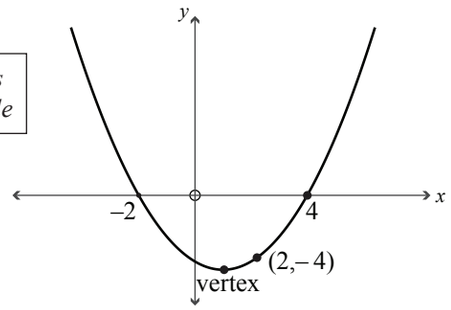


Use algebra to find the value of x.

(c) Make x the subject of the equation $ax^2 - c^2 = dx^2 + e^2$.

(d) The diagram below shows a parabola.

Diagram is NOT to scale



(i) Find the equation of the parabola shown above.
Give your answer in the form $y = ax^2 + bx + c$.
Justify your answer.

(ii) Use your answer from part (i) to solve the equation $ax^2 + bx + c = 8$.
Show algebraic working to support your answer.

QUESTION THREE

(a) The circle at the centre of the rectangle shown below has **circumference** of 16 cm.

Find the **area** of the whole rectangle ABCD.

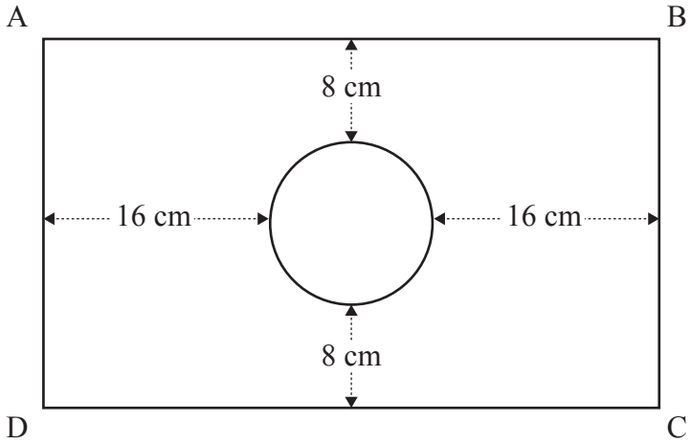
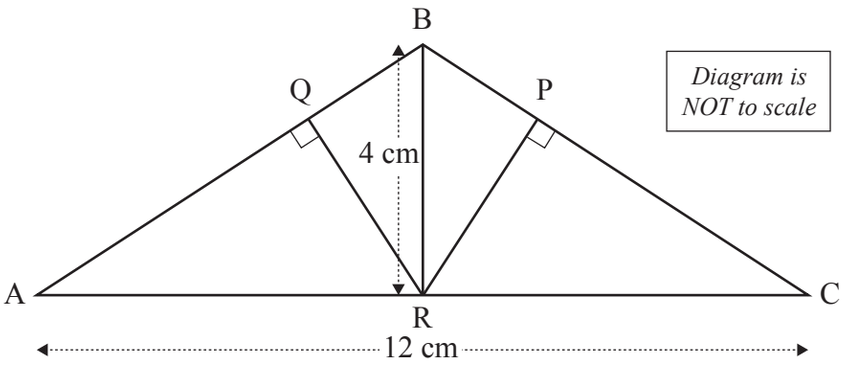


Diagram is NOT to scale

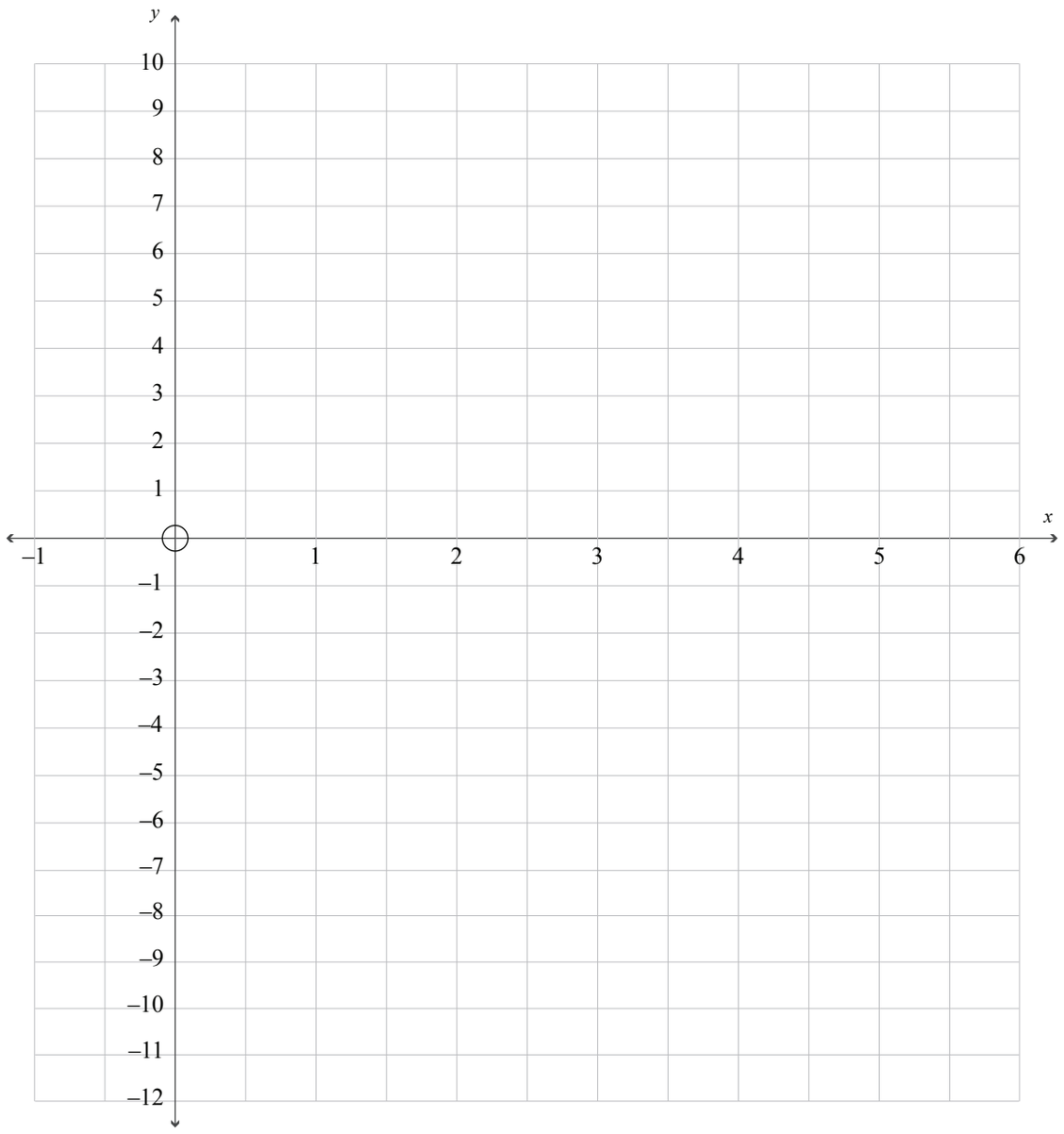
(b) In the diagram shown below, triangle ABC is isosceles, with length AB = length BC, length AC = 12 cm, and length BR = 4 cm.

Find the **perimeter** of the quadrilateral BPRQ.



(c) (i) On the axes below, draw an accurate graph of $2x + y - 5 = 0$.

(ii) On the same axes below, draw an accurate graph of $y = (2x - 1)(x - 5)$.



If you need to redraw your response, use the grid on page 14.

(iii) Using your graphs **or** an algebraic method, solve the equation $(2x-1)(x-5) = -2x+5$.

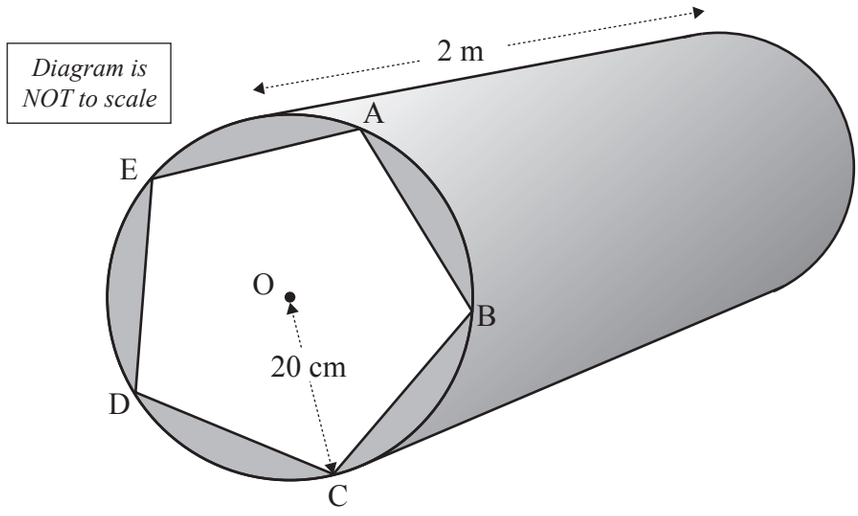
(d) The diagram below shows a regular pentagon, ABCDE, drawn inside a circle with its vertices A, B, C, D, E all lying on the circumference of the circle, with centre O, and radius 20 cm.

The vertices A, B, C, D, E are all fixed firmly to the circumference of the circle.

A solid cylinder, of length 2 metres, has this pentagon shape cut out throughout the centre of the cylinder.

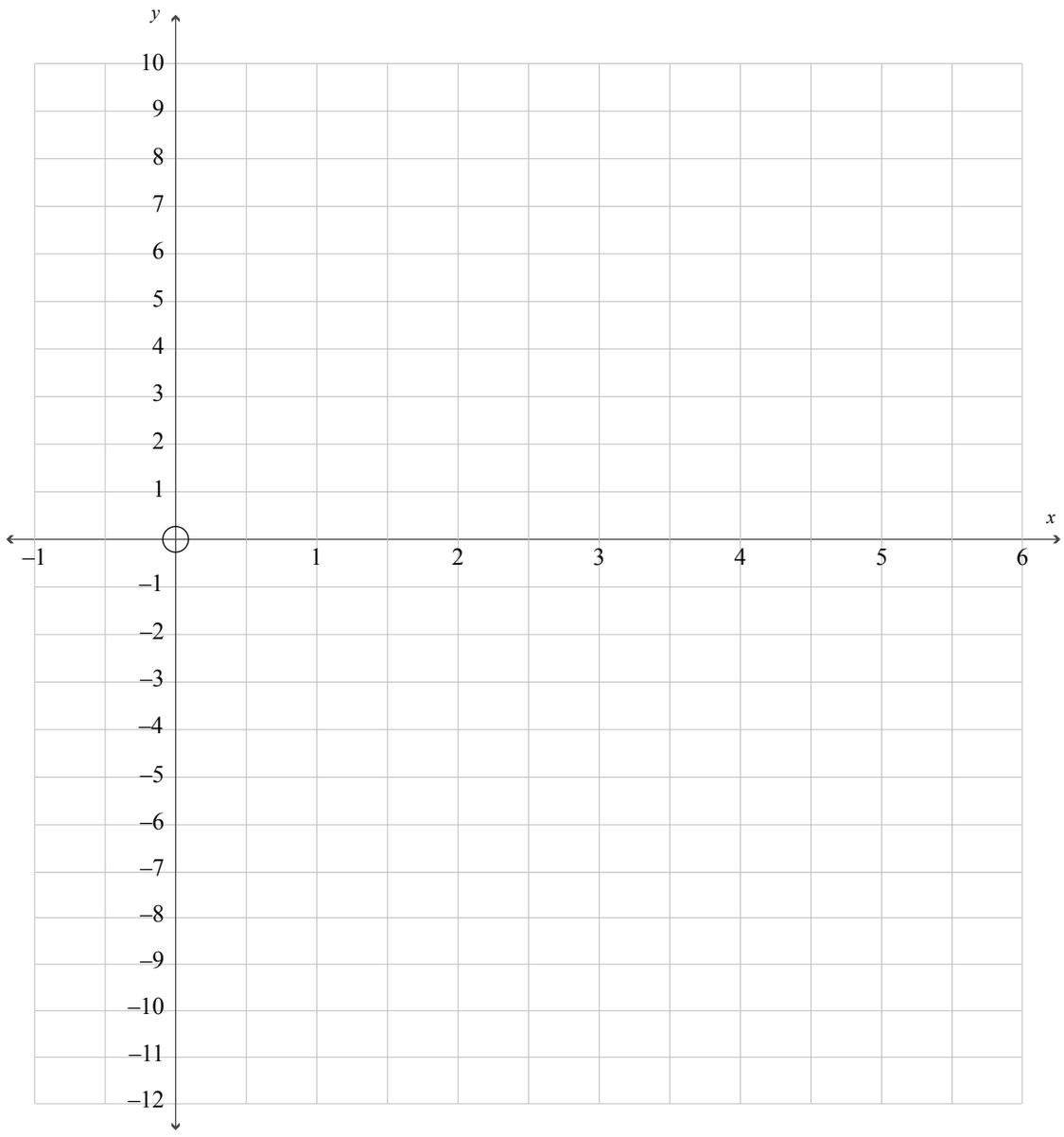
The diagram below shows this situation.

Find the volume of the remaining object.



SPARE DIAGRAM

If you need to redraw your response to Question Three (c), use the grid below. Make sure it is clear which answer you want marked.



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