1   Arjun has a photograph of his house.

Item removed due to third party copyright restrictions.

Arjun orders a canvas print that is mathematically similar to his photograph.
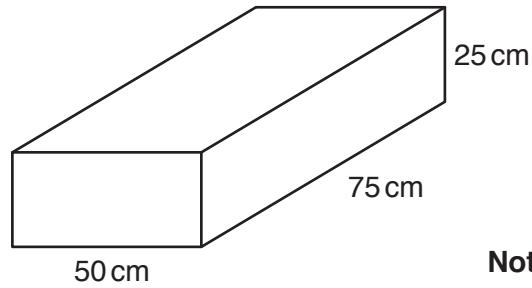
The photograph is 3 inches wide and 2 inches high.
The canvas print is 4 feet wide.
You are given that there are 12 inches in one foot.

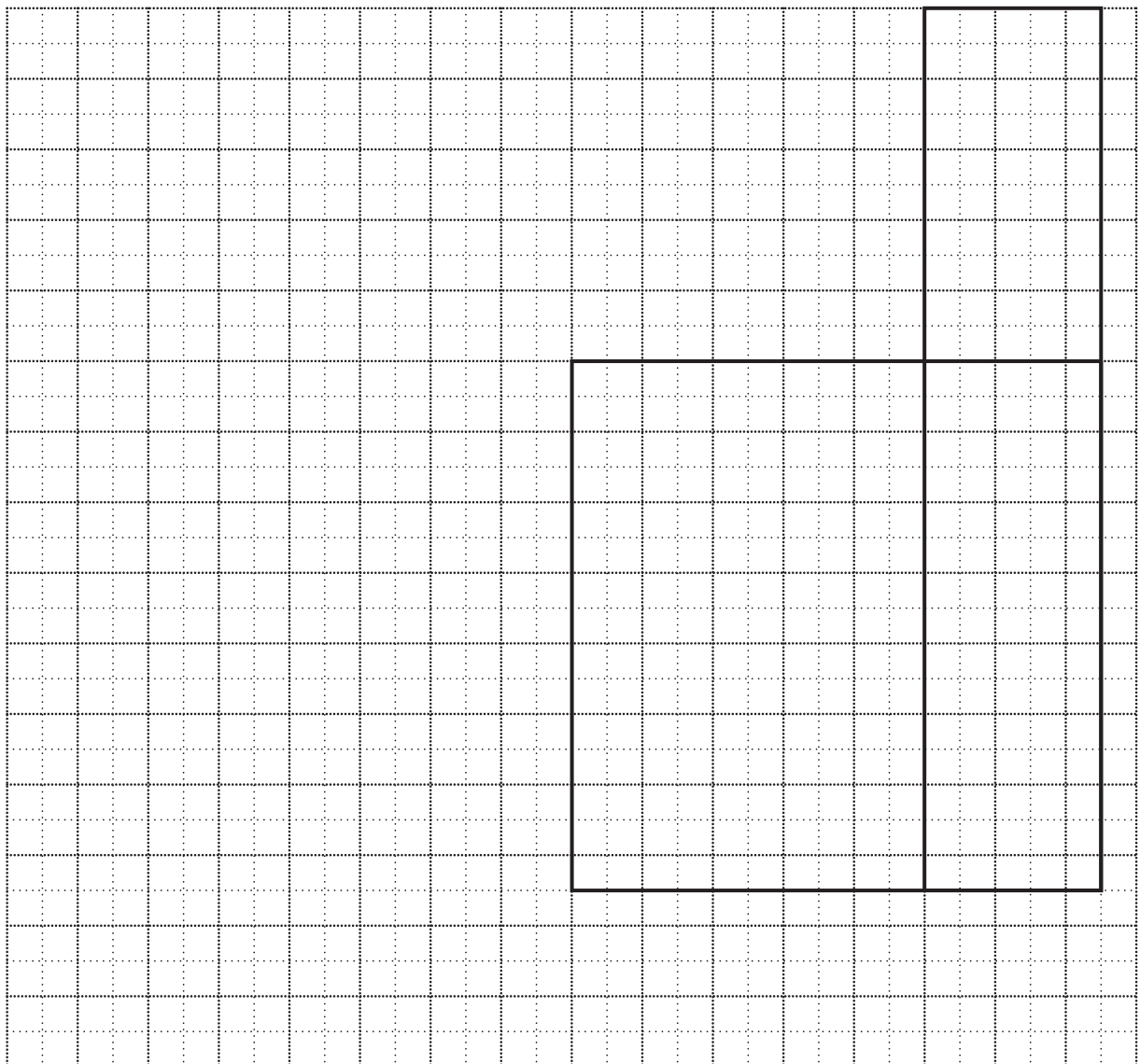Work out the height of the canvas print in feet and inches.

.... feet .... inches **[5]**

2 A closed, empty box is a cuboid.

25 cm

75 cm

50 cm

Not to scale

(a) On the grid below, complete the net of the box.

The base and two of the sides have been drawn.
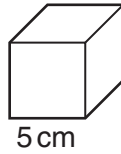
Use a scale of 1 cm to represent 10 cm.

[3]

(b) Work out the total area of the card used to make the **full size** box.

(b) .... cm^2 **[3]**

(c) The empty box is filled with small boxes which are all cubes of edge 5 cm.

5 cm

(i) Calculate the volume of one of these small boxes.

(c)(i) .... cm^3 **[2]**

(ii) How many of these small boxes are needed to fill the large box?

(ii) .... **[3]**
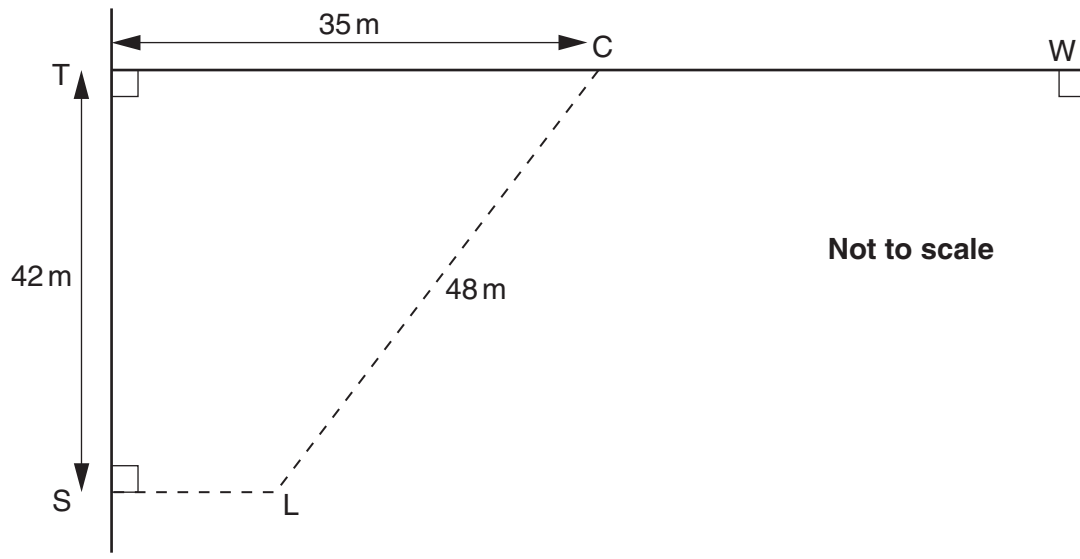
3 Leigh plays rugby and is about to kick the ball towards goal.

(a) He is standing at L.
L is 48 m from the centre C of the goal, and 42 m from the line TW.
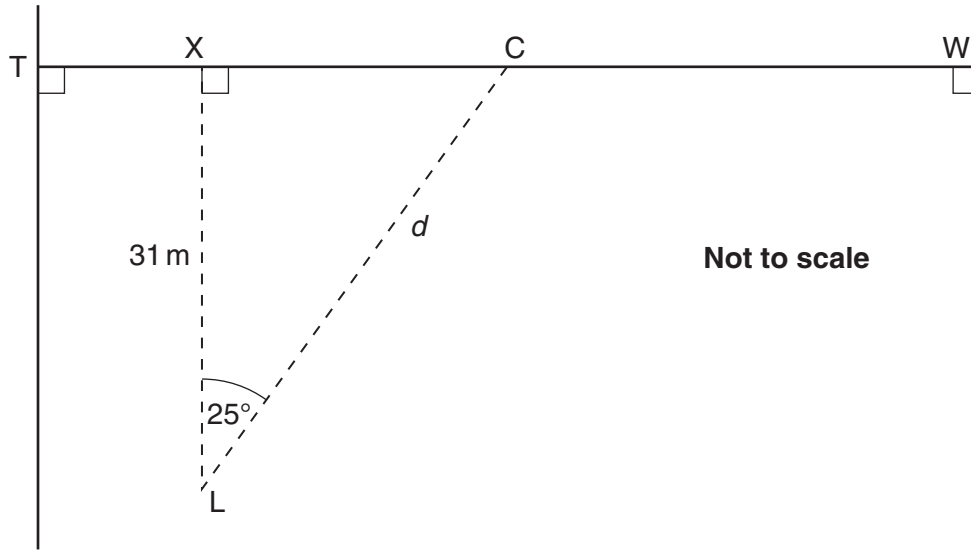The distance TC is 35 m.

(i) Calculate LS, the shortest distance from Leigh to the line ST.

(a)(i) .... m **[4]**

(ii) Calculate angle TCL.

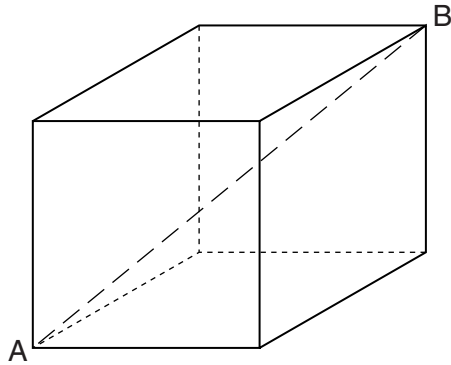**(ii)** .... ° **[3]**

(b) Later in the game, Leigh has another kick towards goal.
This time, he is standing 31 m from the line TW and the angle XLC is 25°.

Calculate the distance, *d*, between Leigh and the centre of the goal.

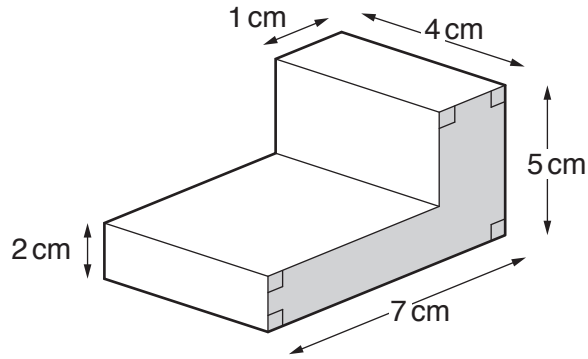**(b)** .... m **[3]**

4 The diagonal, AB, of this cube has length 9 cm.

Work out the total surface area of the cube.
You may find it useful to call the length of the edges of the cube *x*.

_____ cm^2 **[6]**

5   This solid shape is a prism.

Not to scale

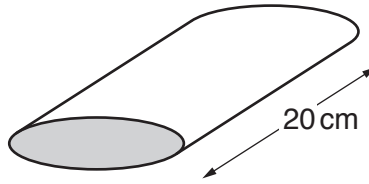**(a)**   Show that the area of the shaded face of the solid is 17 cm^2.   **[2]**

(b)   Work out the **total** surface area of the solid.

(b)   .... cm^2 **[3]**

6 (a) An oil can is a prism 20 cm long.

When full, the can contains 1.2 litres of oil.

20 cm

Calculate the area of the end of the oil can, shown shaded.

(a) .... cm^2 **[3]**

(b) An oil drum, of length 1 m, is an enlargement of the oil can.

1 m
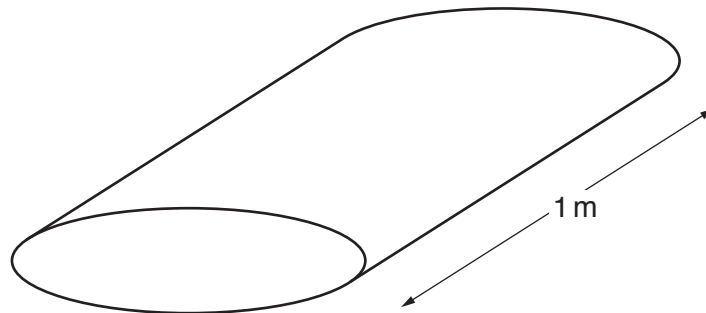
(i) Calculate the area of the end of the oil drum.
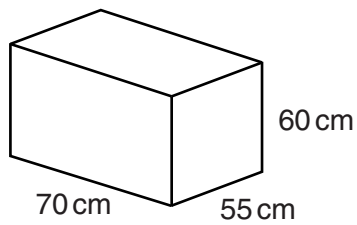
(b)(i) .... cm^2 **[3]**

(ii) Calculate the volume of oil in the drum when full.

(ii) .... litres **[2]**

7 A water tank is a closed cuboid measuring 70 cm by 55 cm by 60 cm.

(a) Work out the total surface area of the tank.

(a) _____ cm^2 **[3]**

(b) Show that the volume of the tank is 231 litres.   **[3]**

(c) The empty tank is filled with water at a rate of 0.6 litres per second.

How long will it take to fill the tank?
Give your answer in minutes and seconds.

(c) _____ minutes _____ seconds **[3]**

8 **(a)** Show that this is a formula for the total surface area, A, of a cube of edge length x.

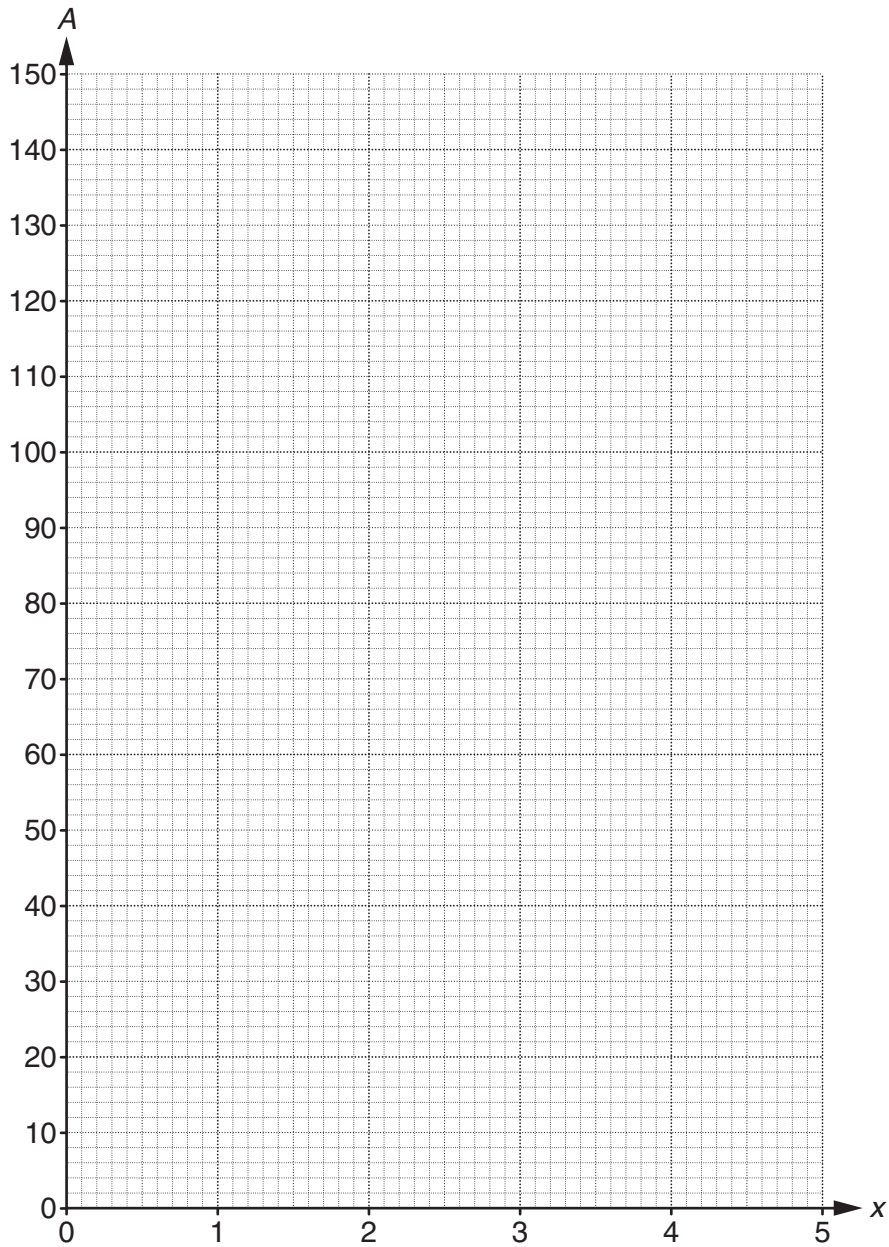$$A = 6x^2$$

Explain clearly each step of your work. **[2]**

(b) Complete the table for $A = 6x^2$ for $0 \leqslant x \leqslant 5$.

x	0	1	2	3	4	5
A	0					

[2]

(c) Draw the graph of $A = 6x^2$ for $0 \leqslant x \leqslant 5$.

[2]

(d) Use your graph to find the length of the edge of a cube which has a total surface area of $70 \, \text{cm}^2$.

(d) .... cm **[1]**

9 A spherical football has a **circumference** of 60 cm.

Calculate the surface area of the football.
Give your answer in its simplest form, in terms of π.

.... cm^2 **[5]**