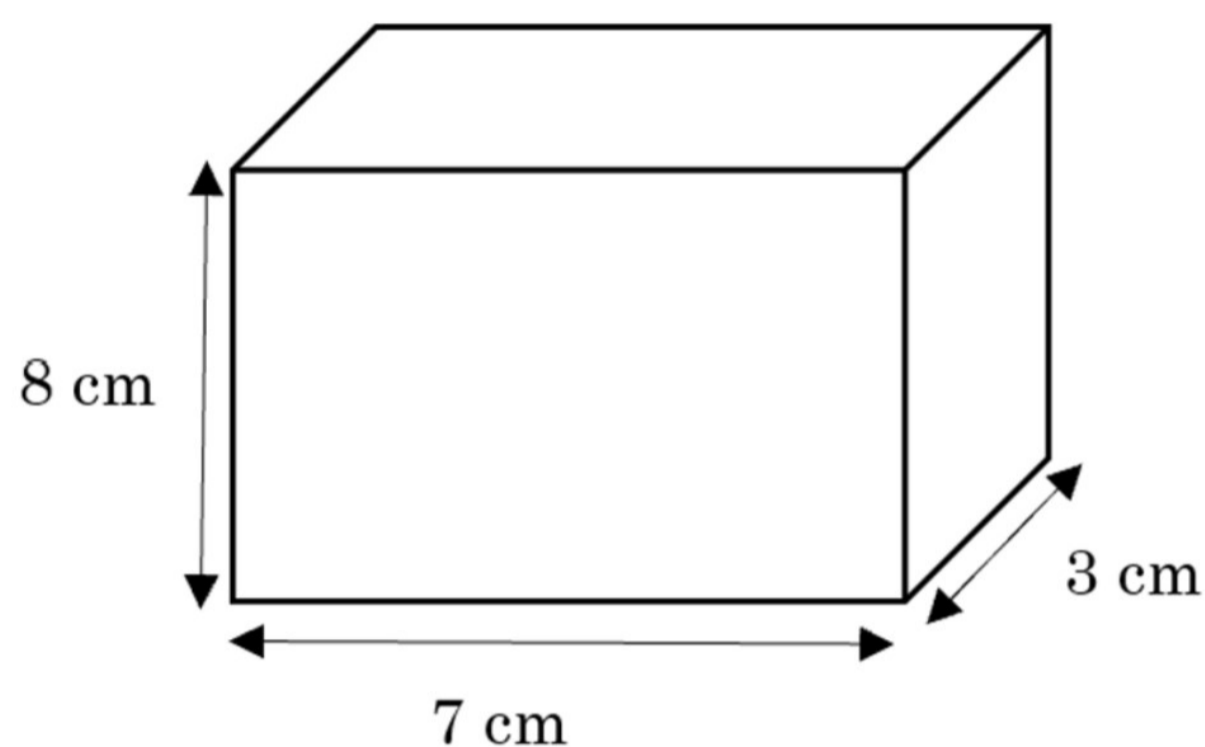




Surface Area Exam Practice

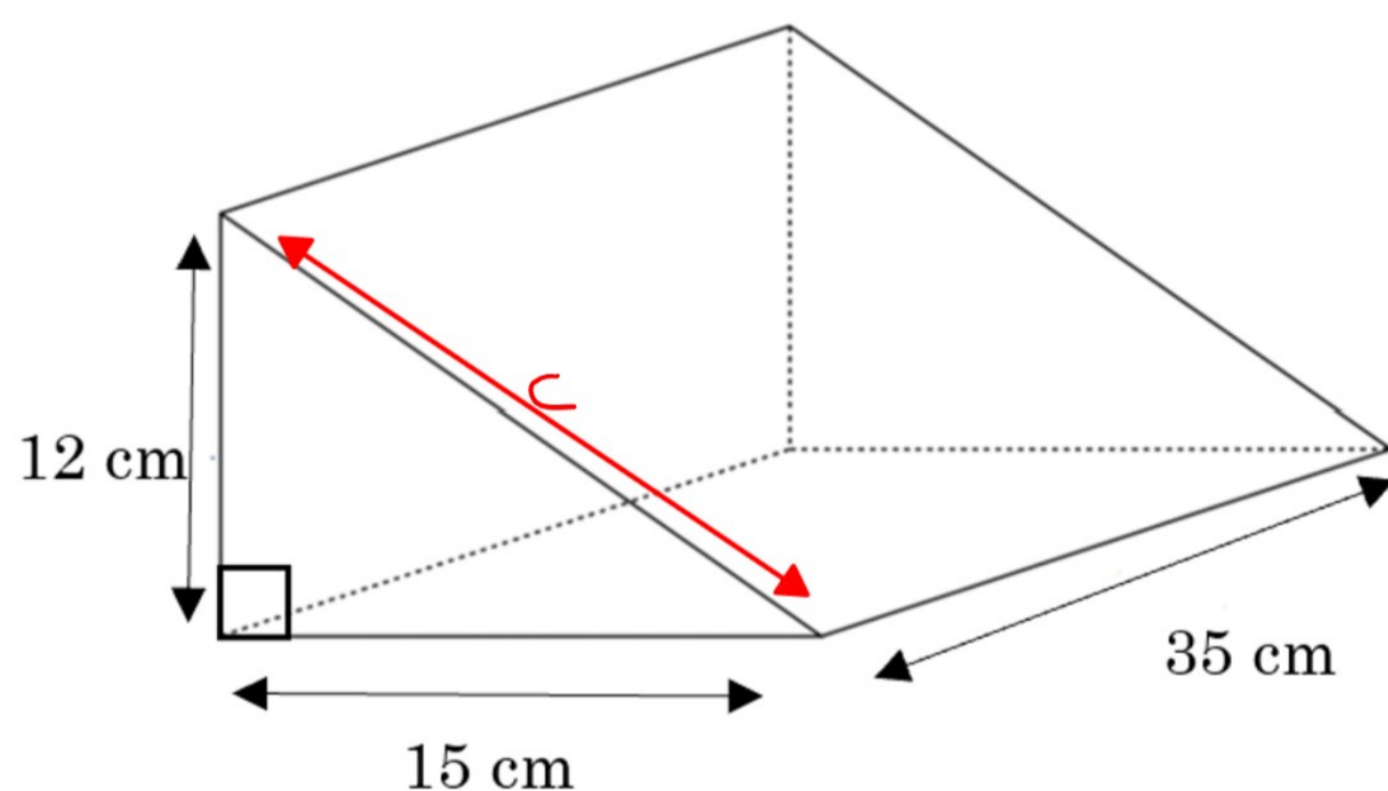
Q1. Work out the surface area of the cuboid shown, stating the units.



$$\begin{aligned} \text{Sides} &: 2 \times (8 \times 3) \\ \text{F \& B} &: 2 \times (8 \times 7) \\ \text{Top \& Base} &: 2 \times (7 \times 3) \\ \hline & 202 \end{aligned}$$

Answer: 202 cm²
(3 marks)

Q2. Work out the surface area of the shape shown, stating the units.



$$\begin{aligned} c &= \sqrt{12^2 + 15^2} \\ &= 3\sqrt{41} \\ &\approx 19.21 \end{aligned}$$

$$\text{Front \& Back} : 2 \times \left(\frac{12 \times 15}{2} \right)$$

$$\text{Side} : 12 \times 35$$

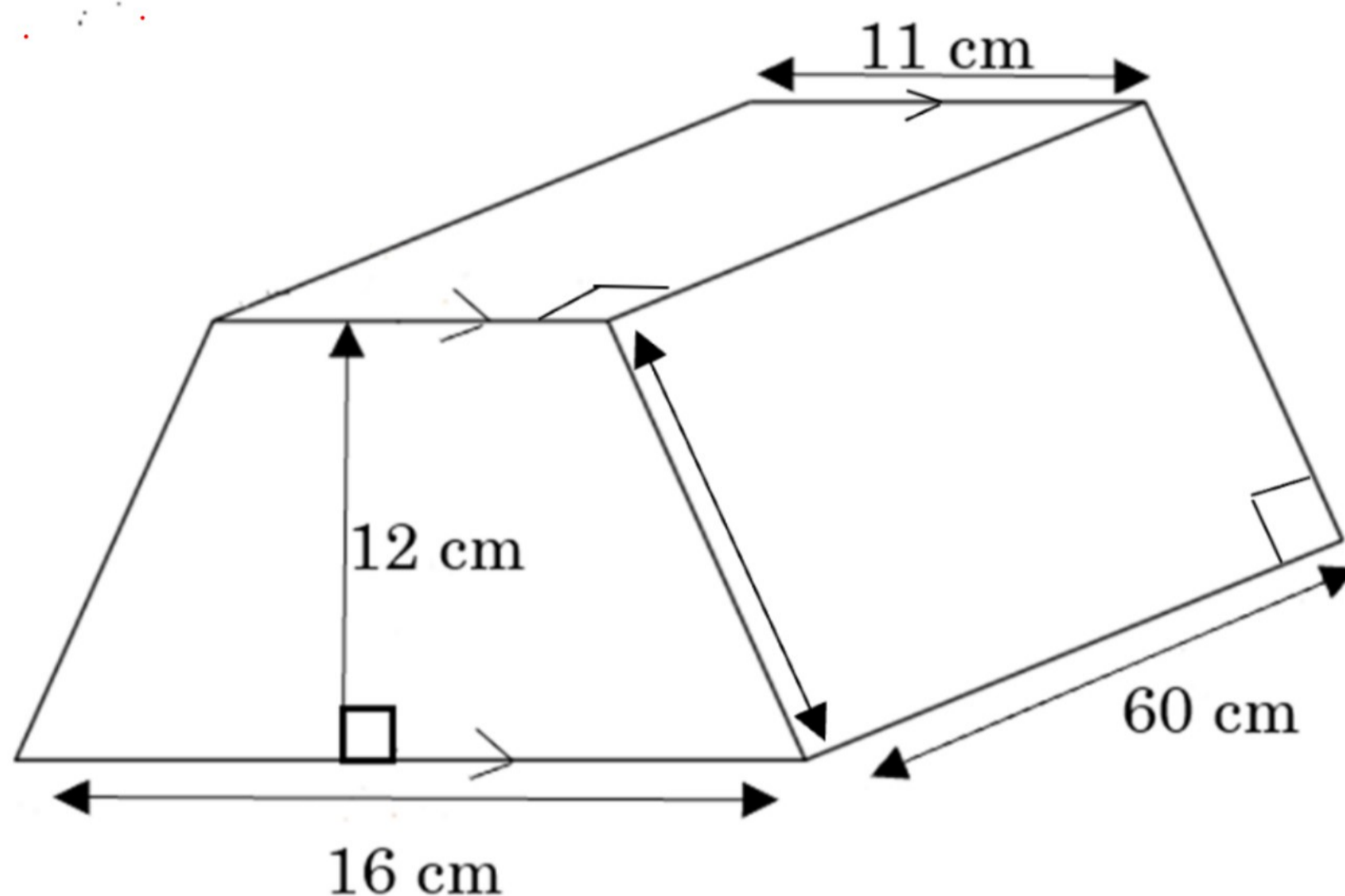
$$\text{Base} : 15 \times 35$$

$$\text{Slope} : \frac{3\sqrt{41} \times 35}{1144.21}$$

Answer: 1144.21 cm²
(5 marks)



Q3. Work out the surface area of the prism shown:



$$F \ \& \ B : 2 \times \left(\frac{1}{2} (21 + 11) \times 12 \right)$$

$$\text{sides} : 2 \times (13 \times 60)$$

$$\text{Top} : 11 \times 60$$

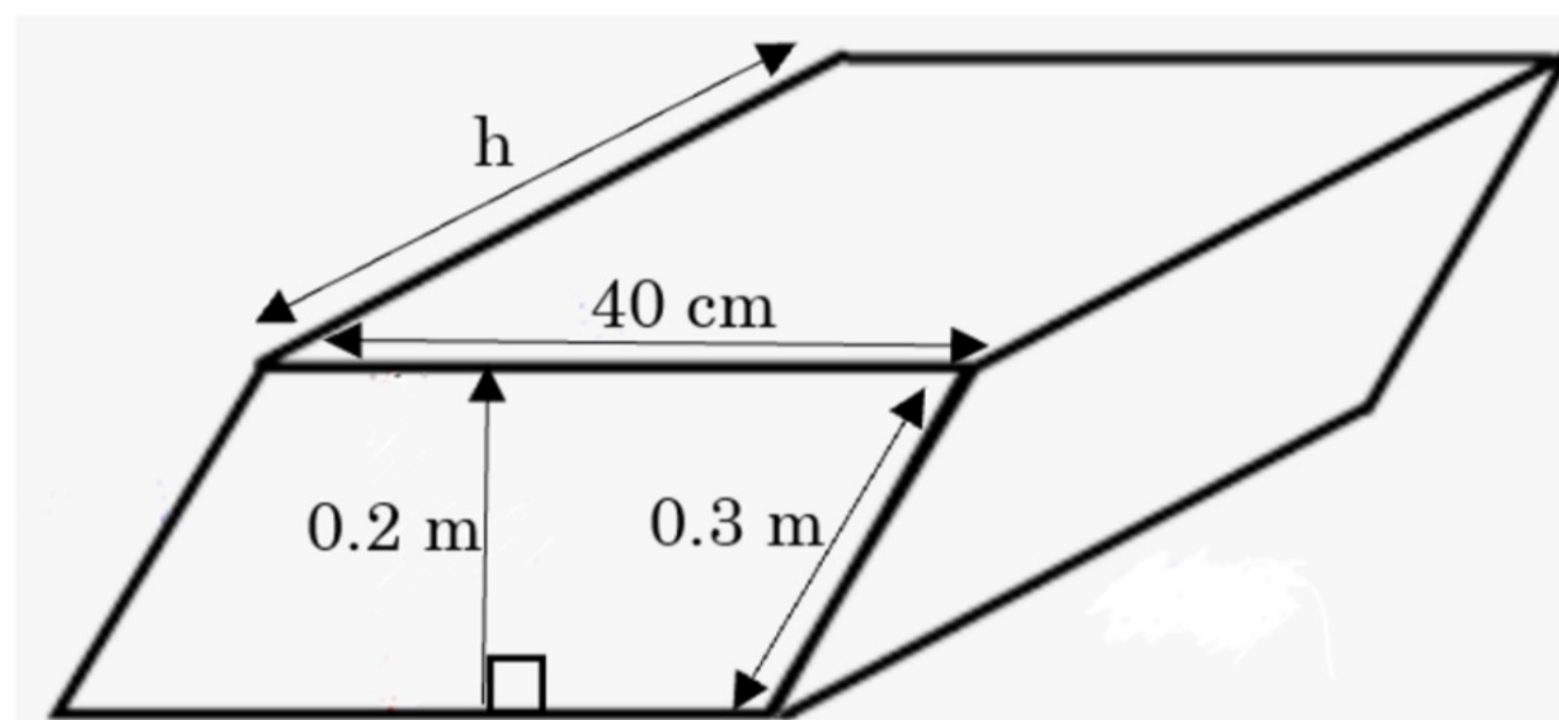
$$\text{Base} : 21 \times 60$$

$$3864 \text{ cm}^2$$

Answer: 3864 cm²
(3 marks)



Q4. The prism below, which has a parallelogram cross-section, has volume 60000 cm^3 . Find the length h .



$$\begin{array}{ccc} \text{Top \& base} & \text{L \& R side} & \text{F \& B} \\ \hline 2 \times 40 \times h & + 2 \times 30 \times h & + 2 \times 20 \times 40 = 60000 \end{array}$$

$$80h + 60h + 1600 = 60000$$

$$140h + 1600 = 60000$$

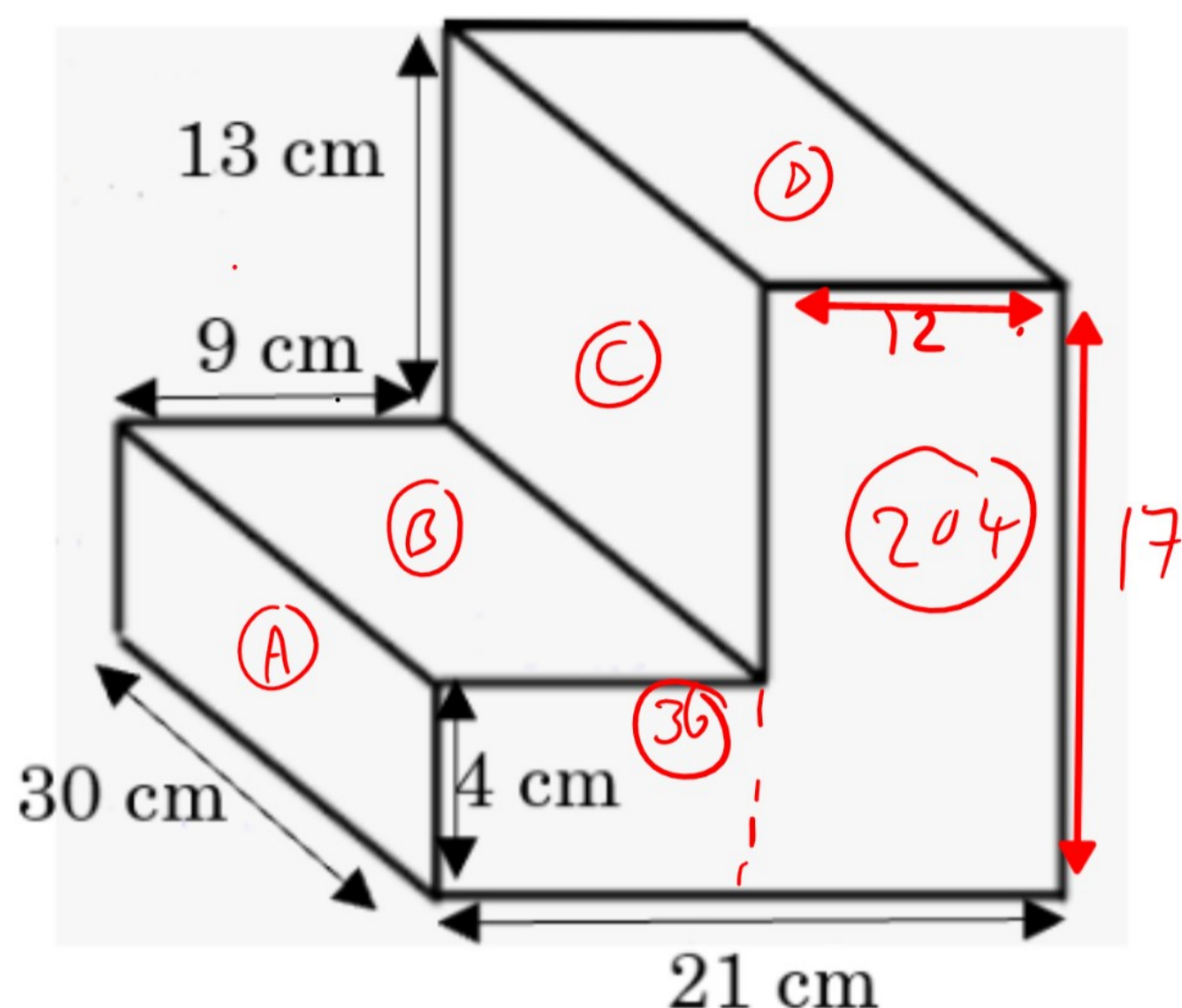
$$140h = 58400$$

$$h = 417.1 \text{ cm}$$

Answer: 417.1 cm
(4 marks)



Q5. Find the surface area of the L-shaped prism below.



$$F \ \& \ B : 2 \times (36 + 204)$$

$$(A) : 30 \times 4$$

$$(B) : 9 \times 30$$

$$(C) : 13 \times 30$$

$$(D) : 12 \times 30$$

$$\text{Base} : \frac{30 \times 21}{2250}$$

Answer: 2250 cm²
(3 marks)

Q6. A prism has a volume of 4.5 m² and length 150 cm. The cross-section is made up of two separate shapes, shape A and shape B, which are joined together. Shape A has area 120 cm².

Find the area of shape B, stating the units.

$$\text{Vol} = (\text{area cross-section A} + \text{area cross-section B}) \times \text{length}$$

$$4.5 \text{ m}^2 = 45,000 \text{ cm}^2 \quad (4.5 \times 10,000)$$

$$45,000 = (120 + \text{area B}) \times 150$$

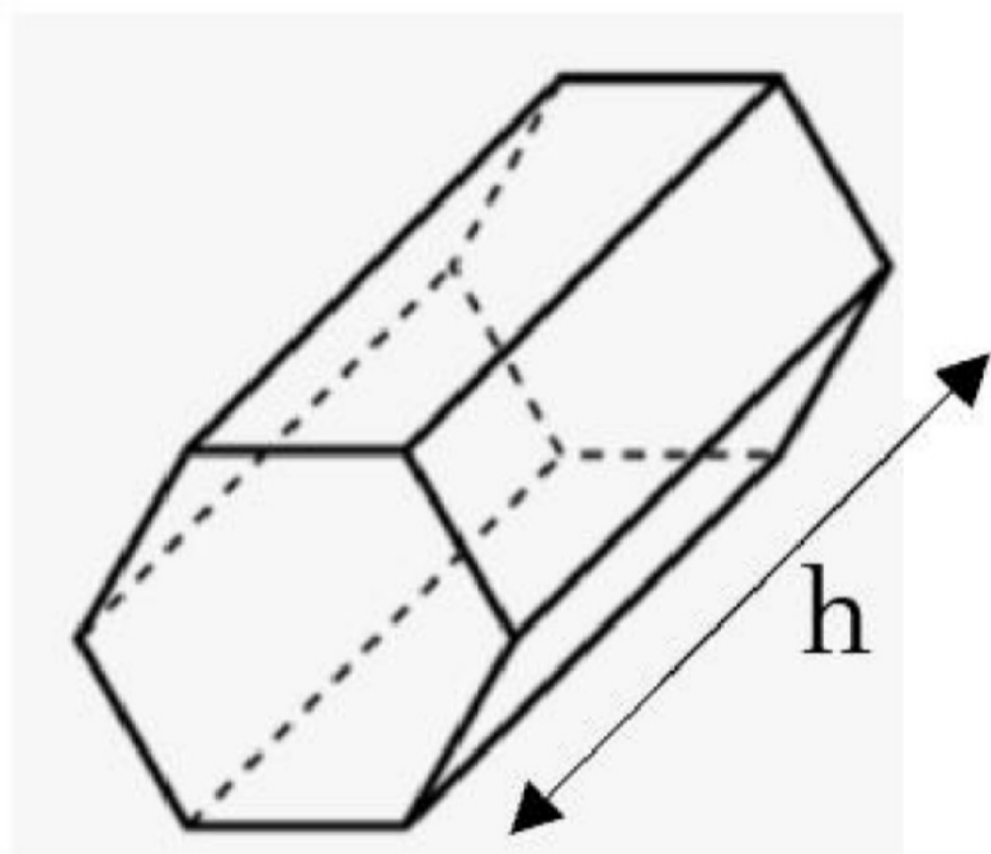
$$300 = 120 + \text{area B}$$

$$\text{Area B} = 180 \text{ cm}^2$$

Answer: 180 cm²
(3 marks)



Q7. The total surface area of this prism is 1200 cm^2 . The cross-section is a regular hexagon with side length 8 cm and has area $96\sqrt{3} \text{ cm}^2$.
Work out the length h shown to 1 decimal place.



$$\text{Total S. Area} = 2 \times \text{area hexagon} + 8 \text{ rectangles}$$

$$1200 = 2 \times 96\sqrt{3} + 8 \times 8 \times h$$

$$1200 = 192\sqrt{3} + 64h$$

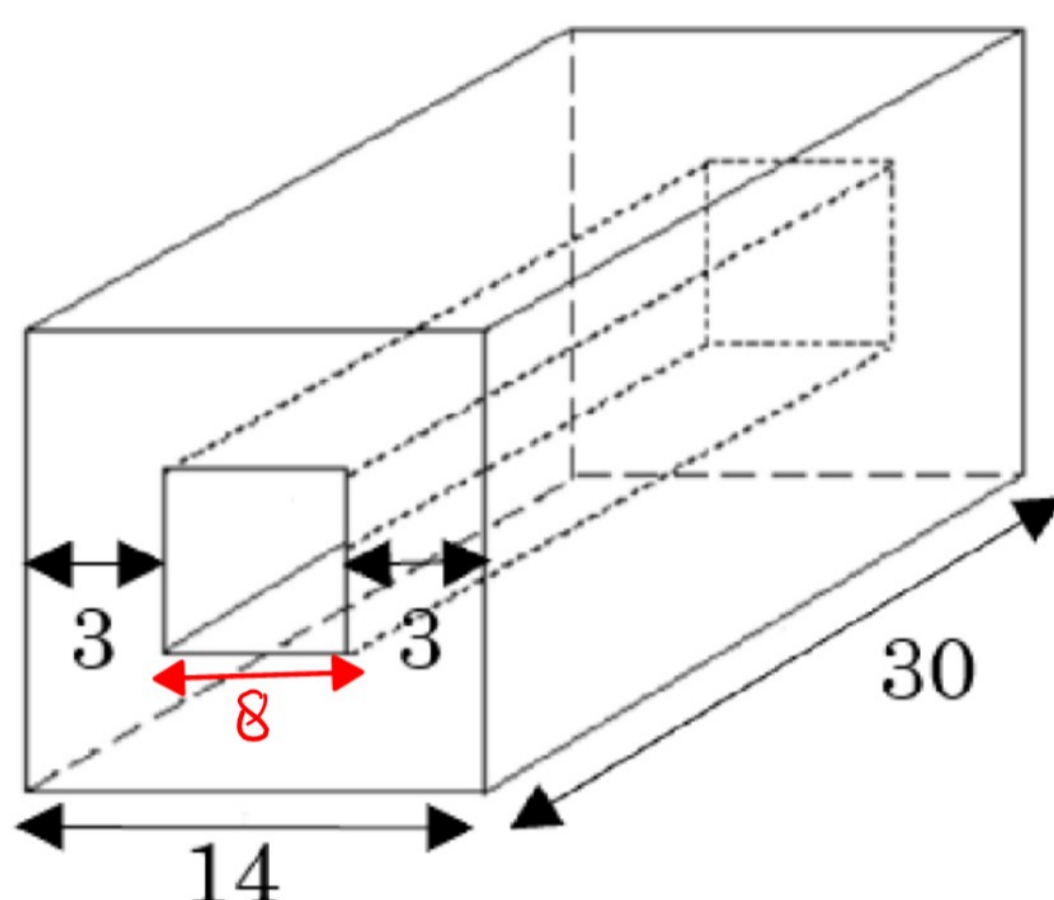
$$h = \frac{1200 - 192\sqrt{3}}{64}$$

$$h = 13.55\dots$$

Answer: 13.6 cm
(3 marks)



Q8. Below is a wooden cuboid. The cross-section is square and has a prism with square cross-section removed from the centre as shown. Find the surface area of the shape.

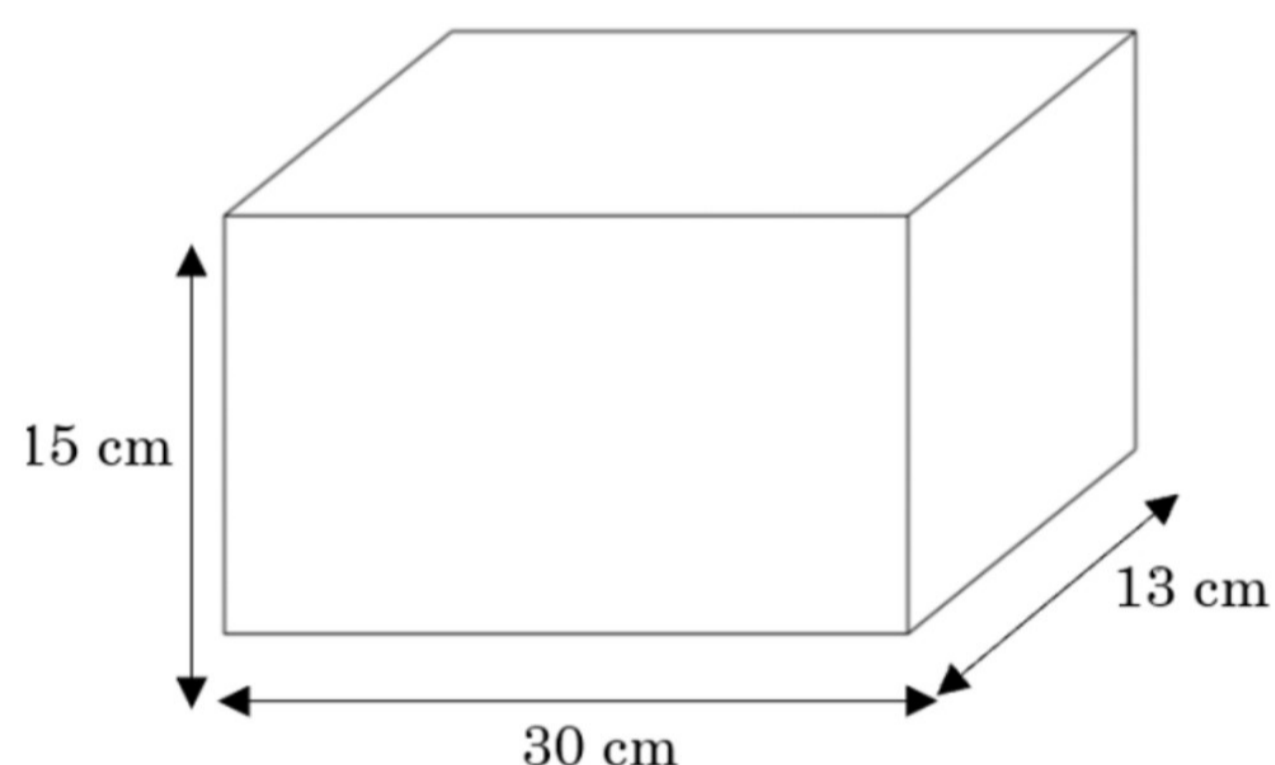


- Outer surface : 2×14^2 (F & B)
+ $4 \times 14 \times 30$ (4 sides)
 - Inner surface : $4 \times (8 \times 30)$ (4 sides only)
- Total : $2072 + 960 = 3032 \text{ units}^2$

Answer: 3032 units²
(4 marks)



Q9. For a display, a tower of 9 bricks, each one placed directly on top of another, is to be built, using cuboid shaped bricks as shown below. Once built, the visible faces will be painted red.



Red paint costs £1.20 per 250 ml pot, and 100 ml of paint will cover 800 cm^2 . Work out the cost of painting the display.

• There will be 9 F & B sides,
9 L & R sides
1 Top side } to be painted red

• Area is :

$$\begin{array}{r} 9 \times 15 \times 30 \\ + 9 \times 15 \times 13 \\ + 30 \times 13 \\ \hline 6195 \text{ cm}^2 \end{array}$$

• $6195 \div 800 = 7.74$, so we need $7.74 \times 100 = 774.375 \text{ ml}$

• We need $774.375 \div 250 = 3.0975$ pots (Buy 4!)

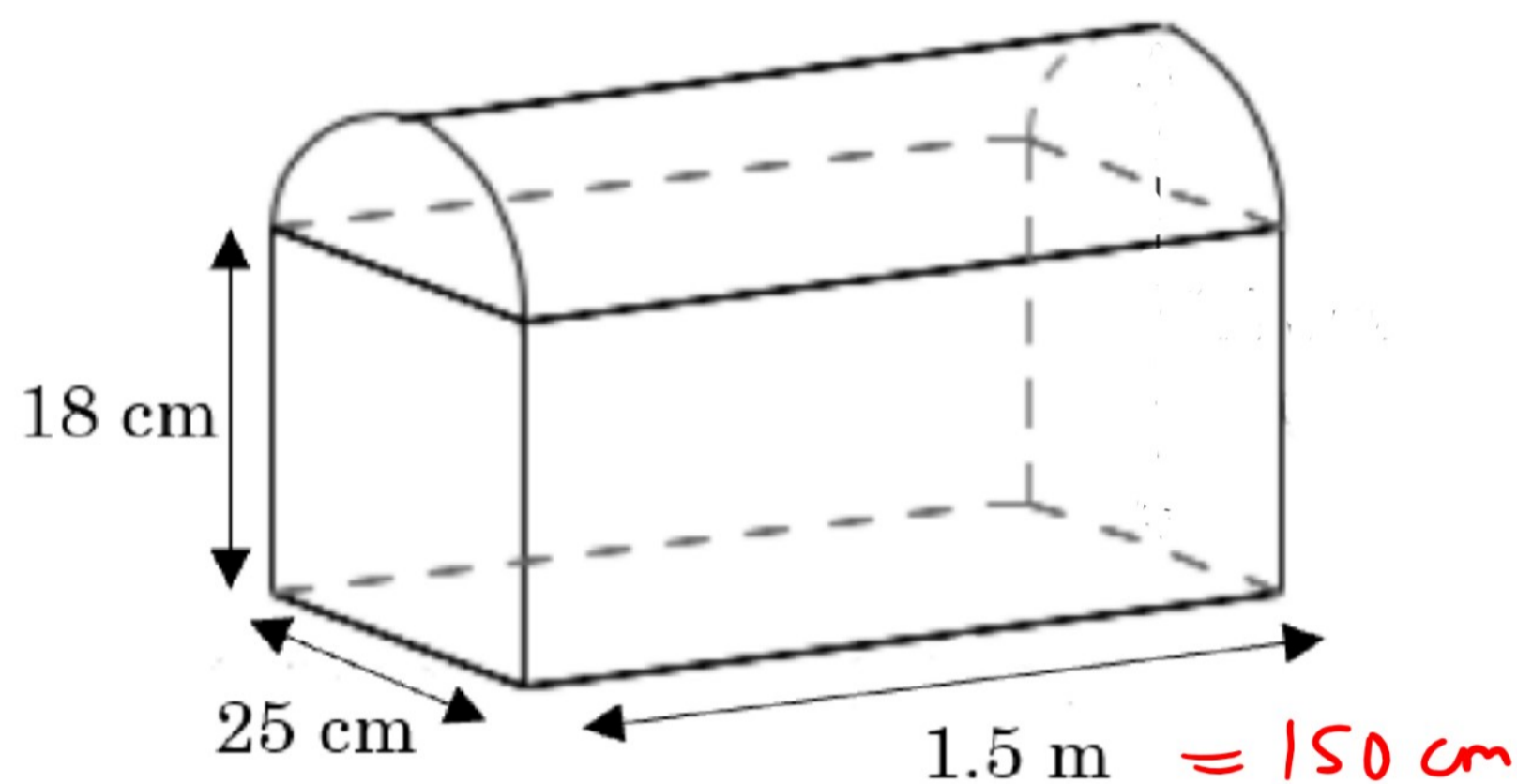
• Cost: $4 \times £1.20 = £4.80$

Answer: £4.80

(5 marks)



Q10. Below is a picture of a mail box which is a semi-cylinder on top of a cuboid. Find the total surface area of the mail box, stating the units.



$$\cdot F \& B : 2 \times \left[18 \times 25 + \frac{1}{2} \times \pi \times 25 \right]$$

$$\cdot \text{Back} : 25 \times 150$$

$$\cdot 2 \text{ sides} : 2 \times 18 \times 150$$

$$\cdot \text{Curved top} : \frac{1}{2} \times \left[\pi \times 25 \times 150 \right]$$

$$\text{Total} : 16919.0 \text{ cm}^2 \text{ (1 d.p.)}$$

Answer: 16919.0 cm²
(4 marks)