

# NOTES: Surface Area of Rectangular and Triangular Prisms

Date: Oct. 12 / Oct. 16

Surface area ← area of all sides added up

- the sum of the areas of all the faces of a 3-dimensional object
- measured in square units (e.g. mm<sup>2</sup>, cm<sup>2</sup>, m<sup>2</sup>)

To find the surface area of an object, you can either:

- use the appropriate formula (doesn't work for irregular or complex shapes)
- or
- calculate the area of each face and add them up → sketching a net first can help you keep track of the faces!

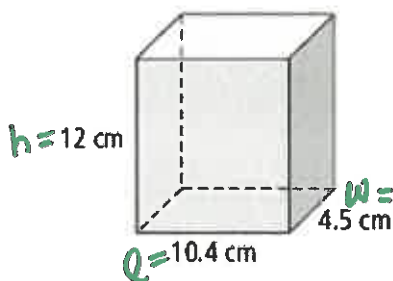
## Surface Area of a Rectangular Prism

Calculate the surface area. Round your answer to the nearest hundredth.

$A = l \times w$

$A = 4.6 \times 1.9$  TOP  
 $= 8.74 \text{ m}^2$   
 $A = 3.8 \times 1.9$  SIDE  
 $= 7.22 \text{ m}^2$   
 $A = 4.6 \times 3.8$  FRONT  
 $= 17.48 \text{ m}^2$   
 BOTTOM (same as TOP)  
 $A = 8.74 \text{ m}^2$   
 BACK (same as FRONT)  
 $A = 17.48 \text{ m}^2$

Calculate the surface area. Round to the nearest hundredth.



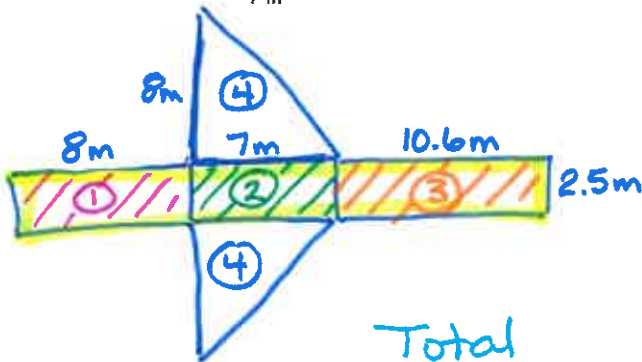
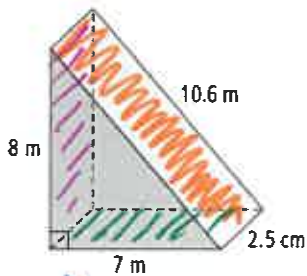
$\text{Total Surface Area} = 2 \times 8.74$   
 $+ 2 \times 17.48$   
 $+ 2 \times 7.22$   
 $\boxed{66.88 \text{ m}^2}$

$SA = 2wh + 2lw + 2lh$   
 $= 2 \times 4.5 \times 12 + 2 \times 10.4 \times 4.5 + 2 \times 10.4 \times 12$   
 $= 108 + 93.6 + 249.6$   
 $\boxed{451.2 \text{ cm}^2}$

## Surface Area of a Triangular Prism

$$\begin{array}{l} \text{Rectangle: } A = l \times w \\ \text{Triangle: } A = \frac{b \times h}{2} \end{array}$$

Calculate the surface area. Round your answer to the nearest hundredth.



$$\textcircled{1} \text{ Rectangle: } A = 8 \times 2.5 = 20 \text{ m}^2$$

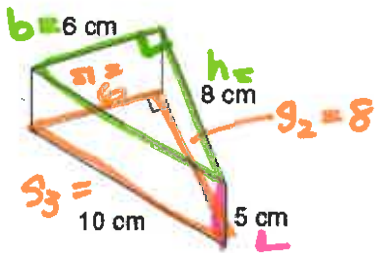
$$\textcircled{2} \text{ Rectangle: } A = 7 \times 2.5 = 17.5 \text{ m}^2$$

$$\textcircled{3} \text{ Rectangle: } A = 10.6 \times 2.5 = 26.5 \text{ m}^2$$

$$\textcircled{4} \text{ Triangles: } A = \frac{7 \times 8}{2} = 28 \text{ m}^2 \text{ each. (x2)}$$

$$\text{Total Surface Area} = 20 + 17.5 + 26.5 + 2(28) = \boxed{120 \text{ m}^2}$$

Calculate the surface area. Round to the nearest hundredth.



$$SA = bh + L(s_1 + s_2 + s_3)$$

base x height of triangle.

perimeter of triangle

Length of prism (distance between triangles)

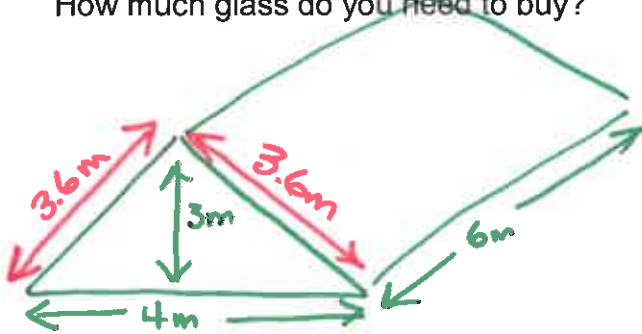
$$\begin{aligned} &= 6 \times 8 + 5(6 + 8 + 10) \\ &= 48 + 5 \times 24 \\ &= 48 + 120 \\ &= 168 \text{ cm}^2 \end{aligned}$$

## Surface Area of Irregular and Complex Shapes

You have been hired to build a client a triangular shaped greenhouse made out of glass.

It is to be 3 metres high, 4 metres wide and 6 metres long. The slant height of the greenhouse will be 3.6 metres.

How much glass do you need to buy?



\* we don't need glass on the bottom!



2 triangles

$$A = \frac{4 \times 3}{2}$$

$$= 6\text{m}^2 \text{ each} \times 2 = \boxed{12\text{m}^2}$$



2 rectangles

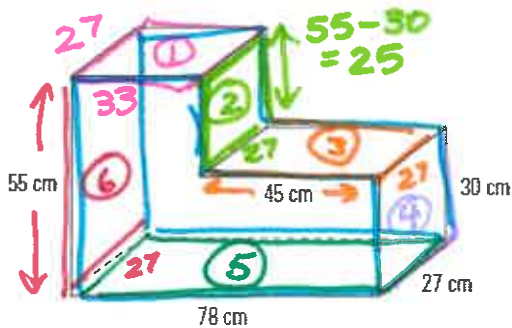
$$A = 6 \times 3.6$$

$$= 21.6\text{m}^2 \text{ each} \times 2 = \boxed{43.2\text{m}^2}$$

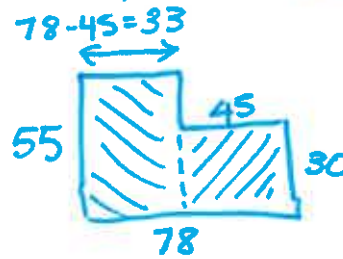
We need to buy:

$$12 + 43.2 = 55.2\text{m}^2 \text{ at least} \Rightarrow \boxed{56\text{m}^2}$$

Calculate the surface area. Round your answer to the nearest hundredth.



FRONT and BACK



$$\begin{aligned}
 A &= 45 \times 30 \\
 &+ 55 \times 33 \\
 &= 1350 \\
 &+ 1815 \\
 &= 3165 \text{ cm}^2 \\
 &\text{each} \\
 &\times 2
 \end{aligned}$$

$$\textcircled{1} \quad A = 33 \times 27 \\
 = 891 \text{ cm}^2$$

$$\textcircled{2} \quad A = 27 \times 25 \\
 = 675 \text{ cm}^2$$

$$\textcircled{3} \quad A = 45 \times 27 \\
 = 1215 \text{ cm}^2$$

$$\textcircled{4} \quad A = 30 \times 27 \\
 = 810 \text{ cm}^2$$

$$\textcircled{5} \quad A = 78 \times 27 \\
 = 2106 \text{ cm}^2$$

$$\textcircled{6} \quad A = 55 \times 27 \\
 = 1485 \text{ cm}^2$$

$$\begin{aligned}
 SA &= (2 \times 3165) + 891 + 675 + 1215 + 810 + 2106 \\
 &\quad + 1485 \\
 &= \boxed{13512 \text{ cm}^2}
 \end{aligned}$$