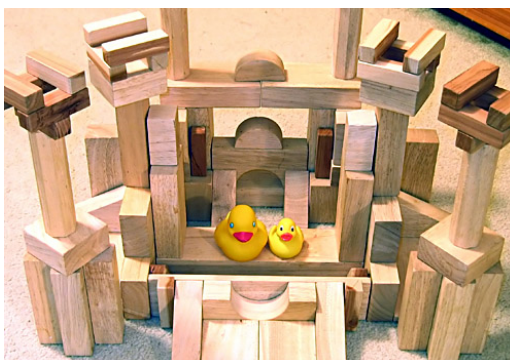




# Surface Area Of Other Composite Objects



**Surface area????**

### Other Composite Shapes

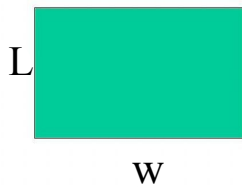
3-D shapes sitting on other 3-D shapes

This will cause an **overlap**, meaning that the entire two or more shapes are not exposed to the surface.

## Area of Shapes

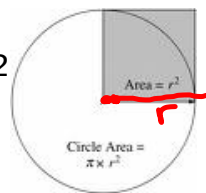
### Area of a Rectangle

A = length x width



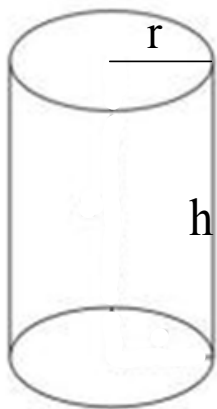
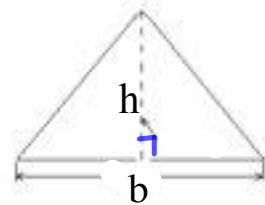
### Area of a Circle

$$A = \pi r^2$$



### Area of Triangle

$$A = \frac{1}{2} (\text{base} \times \text{height})$$

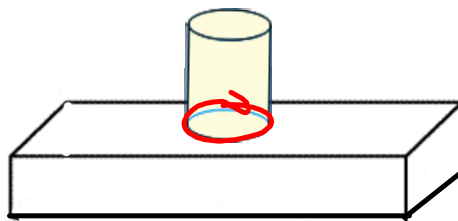
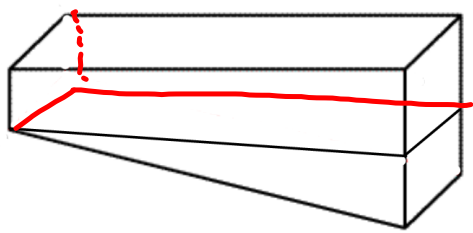


2 circles + rectangle

$$\text{Surface Area of Cylinder} = 2\pi r^2 + 2\pi rh$$

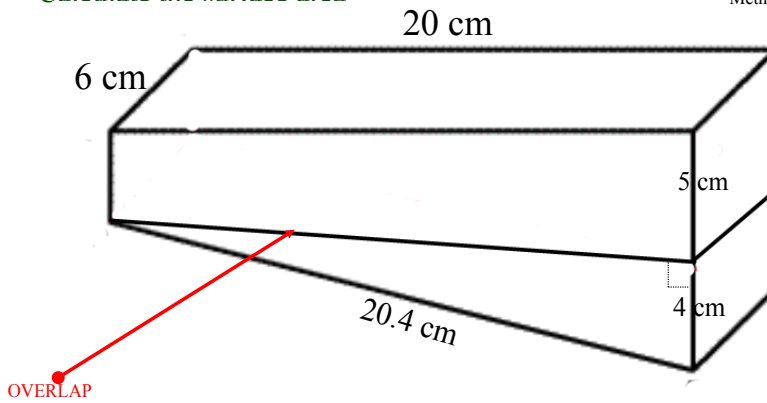
What is this "Composite Shape" made up of ?

Is there an overlap?



Calculate the surface area

Method 1)

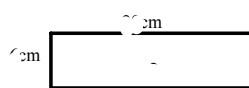


Step 1) Calculate the overlap area BUT remember 2 faces are involved

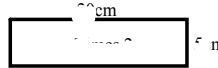
$$\begin{aligned}
 A &= 6 \text{ cm} \times 20 \text{ cm} \\
 &= 120 \text{ cm}^2 \\
 &\quad \times 2 \\
 &= 240 \text{ cm}^2 \quad \text{total overlap}
 \end{aligned}$$

Step 2) Calculate the Surface area of each Prism INDIVIDUALLY

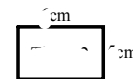
**Rectangular prism (Surface exposed)**



$$\begin{aligned}
 A &= 6 \text{ cm} \times 20 \text{ cm} \\
 &= 120 \text{ cm}^2
 \end{aligned}$$



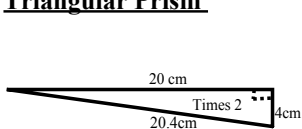
$$\begin{aligned}
 A &= 5 \text{ cm} \times 20 \text{ cm} \\
 &= 100 \text{ cm}^2
 \end{aligned}$$



$$\begin{aligned}
 A &= 5 \text{ cm} \times 6 \text{ cm} \\
 &= 30 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of rectangular prisms} &= 2(120 \text{ cm}^2) + 2(100 \text{ cm}^2) + 2(30 \text{ cm}^2) \\
 &= 240 \text{ cm}^2 + 200 \text{ cm}^2 + 60 \text{ cm}^2 \\
 &= 500 \text{ cm}^2
 \end{aligned}$$

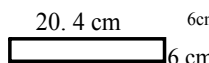
**Triangular Prism**



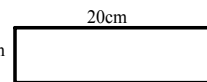
$$\begin{aligned}
 A &= (20 \text{ cm} \times 4 \text{ cm}) / 2 \\
 &= (80 \text{ cm}^2) / 2 \\
 &= 40 \text{ cm}^2
 \end{aligned}$$



$$\begin{aligned}
 A &= 4 \text{ cm} \times 6 \text{ cm} \\
 &= 24 \text{ cm}^2
 \end{aligned}$$



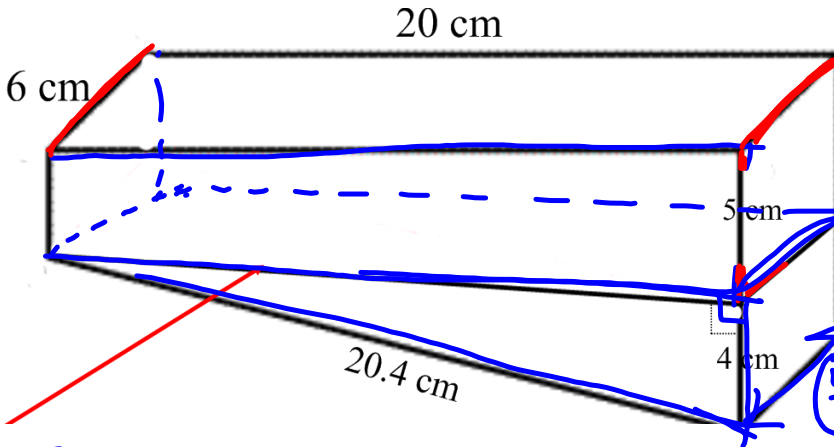
$$\begin{aligned}
 A &= 20.4 \text{ cm} \times 6 \text{ cm} \\
 &= 122.4 \text{ cm}^2
 \end{aligned}$$



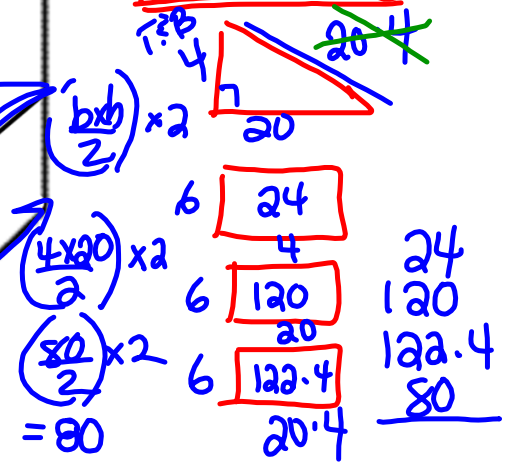
$$\begin{aligned}
 A &= 6 \text{ cm} \times 20 \text{ cm} \\
 &= 120 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of triangular prism} &= 2(40 \text{ cm}^2) + 24 \text{ cm}^2 + 122.4 \text{ cm}^2 + 120 \text{ cm}^2 \\
 &= 80 \text{ cm}^2 + 24 \text{ cm}^2 + 122.4 \text{ cm}^2 + 120 \text{ cm}^2 \\
 &= 346.4 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Total Surface Area} &= \text{Rectangular prism} + \text{Triangular Prism} - \text{OVERLAP} \\
 &= (500 \text{ cm}^2) + 346.4 \text{ cm}^2 - 240 \text{ cm}^2 \\
 &= 606.4 \text{ cm}^2
 \end{aligned}$$



Tri Prism



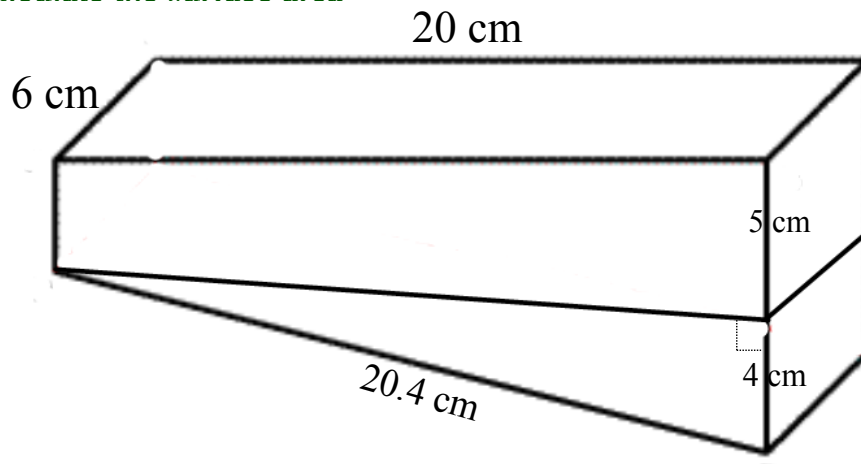
Rec Prism

$T \& B \quad (6 \times 20) \times 2 = 240 \text{ cm}^2$   
 $F \& B \quad (5 \times 20) \times 2 = 200 \text{ cm}^2$   
 Sides  $(5 \times 6) \times 2 = 60 \text{ cm}^2$   
 $30 \times 2 = 60 \text{ cm}^2$   
500 cm<sup>2</sup>

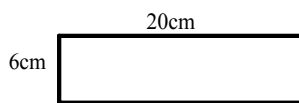
Overlap  
 $(20 \times 6) \times 2 = 240$

$500$   
 $+ 346.40$   
 $- 240$   
 $= 606.40 \text{ cm}^2$

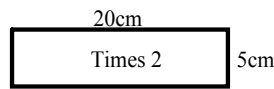
Calculate the surface area



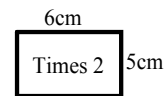
Rectangular prism (Surface exposed)



$$A = 6\text{ cm} \times 20\text{ cm} \\ = 120\text{ cm}^2$$



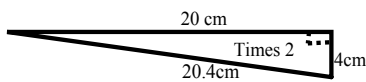
$$A = 5\text{ cm} \times 20\text{ cm} \\ = 100\text{ cm}^2$$



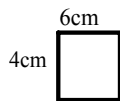
$$A = 5\text{ cm} \times 6\text{ cm} \\ = 30\text{ cm}^2$$

$$\begin{aligned} \text{Area of rectangular prims exposed} &= 120\text{ cm}^2 + 2(100\text{ cm}^2) + 2(30\text{ cm}^2) \\ &= 120\text{ cm}^2 + 200\text{ cm}^2 + 60\text{ cm}^2 \\ &= 380\text{ cm}^2 \end{aligned}$$

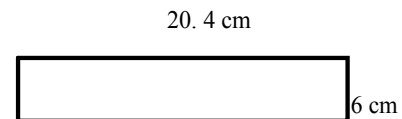
Triangular Prism (Surface Exposed)



$$\begin{aligned} A &= (20\text{ cm} \times 4\text{ cm}) / 2 \\ &= (80\text{ cm}^2) / 2 \\ &= 40\text{ cm}^2 \end{aligned}$$



$$A = 4\text{ cm} \times 6\text{ cm} \\ = 24\text{ cm}^2$$



$$A = 20.4\text{ cm} \times 6\text{ cm} \\ = 122.4\text{ cm}^2$$

$$\begin{aligned} \text{Area of triangular prism exposed} &= 2(40\text{ cm}^2) + 24\text{ cm}^2 + 122.4\text{ cm}^2 \\ &= 80\text{ cm}^2 + 24\text{ cm}^2 + 122.4\text{ cm}^2 \\ &= 226.4\text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Total Surface Area} &= \text{Rectangular prism exposed} + \text{Triangular Prism Exposed} \\ &= (380\text{ cm}^2) + 226.4\text{ cm}^2 \\ &= 606.4\text{ cm}^2 \end{aligned}$$