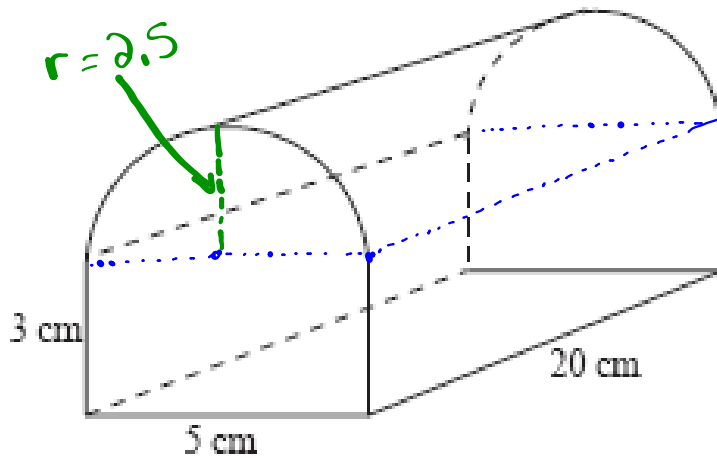


Find the volume



(i) Rectangular Prism:      (ii) Cylinder (half)

$$V = \underline{l} \times \underline{w} \times h$$

$$V = \underline{20} \times \underline{5} \times 3$$

$$V = 300 \text{ cm}^3$$

$$V = \underline{\pi r^2} h$$

$$V = \underline{(3.14)(2.5)^2} (20)$$

$$V = 392.5 \text{ cm}^3 \text{ (full cylinder)}$$

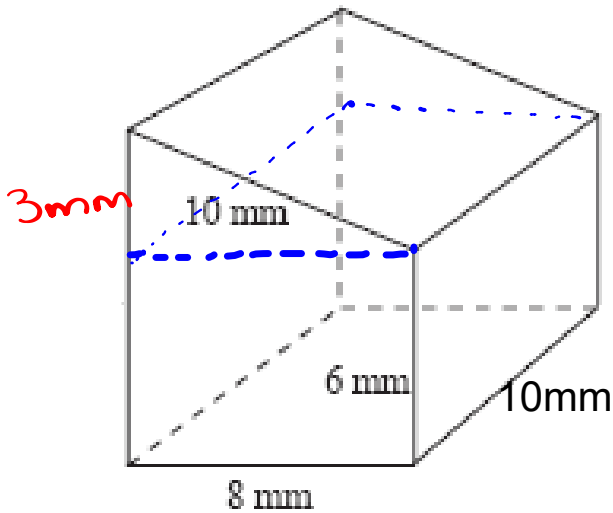
$$V = \frac{392.5 \text{ cm}^3}{2}$$

$$V = 196.25 \text{ cm}^3 \text{ (half cylinder)}$$

$$(iii) \text{ Total Volume} = 300 + 196.25$$

$$= 496.25 \text{ cm}^3$$

Find the volume



(i) Rectangular Prism:

$$V = lwh$$

$$V = (10)(8)(6)$$

$$V = 480 \text{ mm}^3$$

(ii) Triangular Prism:

$$V = \left( \frac{b \times h}{2} \right) h$$

$$V = \left( \frac{8 \times 3}{2} \right) 10$$

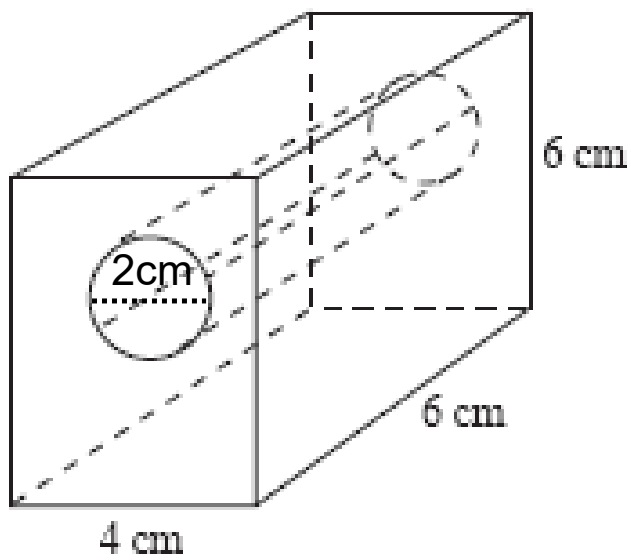
$$V = (12)(10)$$

$$V = 120 \text{ mm}^3$$

$$\text{Total Volume} = 480 + 120$$

$$= 600 \text{ mm}^3$$

Find the volume and surface area



### Rectangular Prism

$$\begin{aligned}
 SA &= T \& B \quad (4 \times 6) \times 2 = 48 \\
 &F \& B \quad (4 \times 6) \times 2 = 48 \\
 &Sides \quad (6 \times 6) \times 2 = 72 \\
 &= 168 \text{ cm}^2
 \end{aligned}$$

### Cylinder

$$\begin{aligned}
 SA &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(1)^2 + 2(3.14)(1)(6) \\
 &= \underline{2(3.14)(1)} + \underline{2(3.14)(1)(6)} \\
 &= 6.28 + 37.68 \\
 &= 43.96 \text{ cm}^2
 \end{aligned}$$

### Overlap

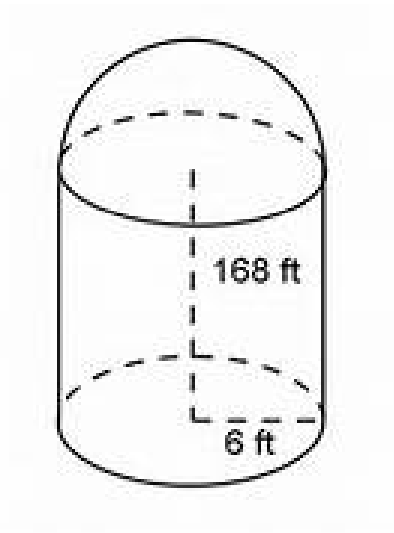
$$\begin{aligned}
 4 \text{ Circles} & \quad 4\pi r^2 \\
 &= 4(3.14)(1)^2 \\
 &= 4(3.14)(1) \\
 &= 12.56 \text{ cm}^2
 \end{aligned}$$

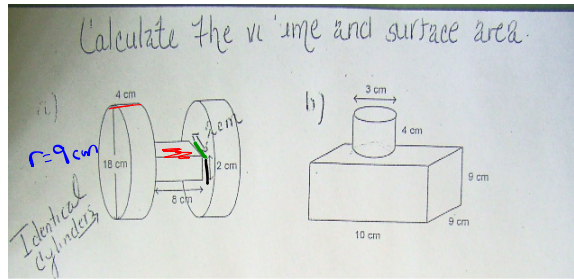
### Total

$$\begin{aligned}
 &168 \\
 &+ 43.96 \\
 &- 12.56 \\
 \hline
 &= 199.4 \text{ cm}^2
 \end{aligned}$$



Find the volume and surface area





Volume:

a) Cylinder:

$$V = \pi r^2 h$$

$$V = (3.14)(9)^2(4)$$

$$V = (3.14)(81)(4)$$

$$V = 1017.36 \text{ cm}^3 \text{ (1 cylinder)}$$

$$V = 2(1017.36)$$

$$V = \underline{\underline{2034.72 \text{ cm}^3}} \text{ (2 cylinders)}$$

Rectangular Prism

$$V = l \times w \times h$$

$$V = 2 \times 2 \times 8$$

$$V = \underline{\underline{32 \text{ cm}^3}}$$

$$\text{Total Volume} = 2034.72 \text{ cm}^3 + 32 \text{ cm}^3$$

$$= \underline{\underline{2066.72 \text{ cm}^3}}$$

Surface Area:

① Cylinder:

$$SA = 2\pi r^2 + 2\pi r h$$

$$SA = 2(3.14)(9)^2 + 2(3.14)(9)(4)$$

$$SA = 2(3.14)(81) + 2(3.14)(9)(4)$$

$$SA = 508.68 + 226.08$$

$$SA = 734.76 \text{ cm}^2 \text{ (1 cylinder)}$$

$$SA = 2(734.76)$$

$$SA = \underline{\underline{1469.52 \text{ cm}^2}} \text{ (2 cylinders)}$$

② Rectangular Prism:

Top/Bottom

$$SA = 2(l \times w)$$

$$SA = 2(8 \times 2)$$

$$SA = 2(16)$$

$$SA = 32 \text{ cm}^2$$

Front/Back:

$$SA = 2(l \times w)$$

$$SA = 2(8 \times 2)$$

$$SA = 2(16)$$

$$SA = 32 \text{ cm}^2$$

Left/Right

$$SA = 2(l \times w)$$

$$SA = 2(2 \times 2)$$

$$SA = 2(4)$$

$$SA = 8$$

③ Overlap: (Double Overlap)

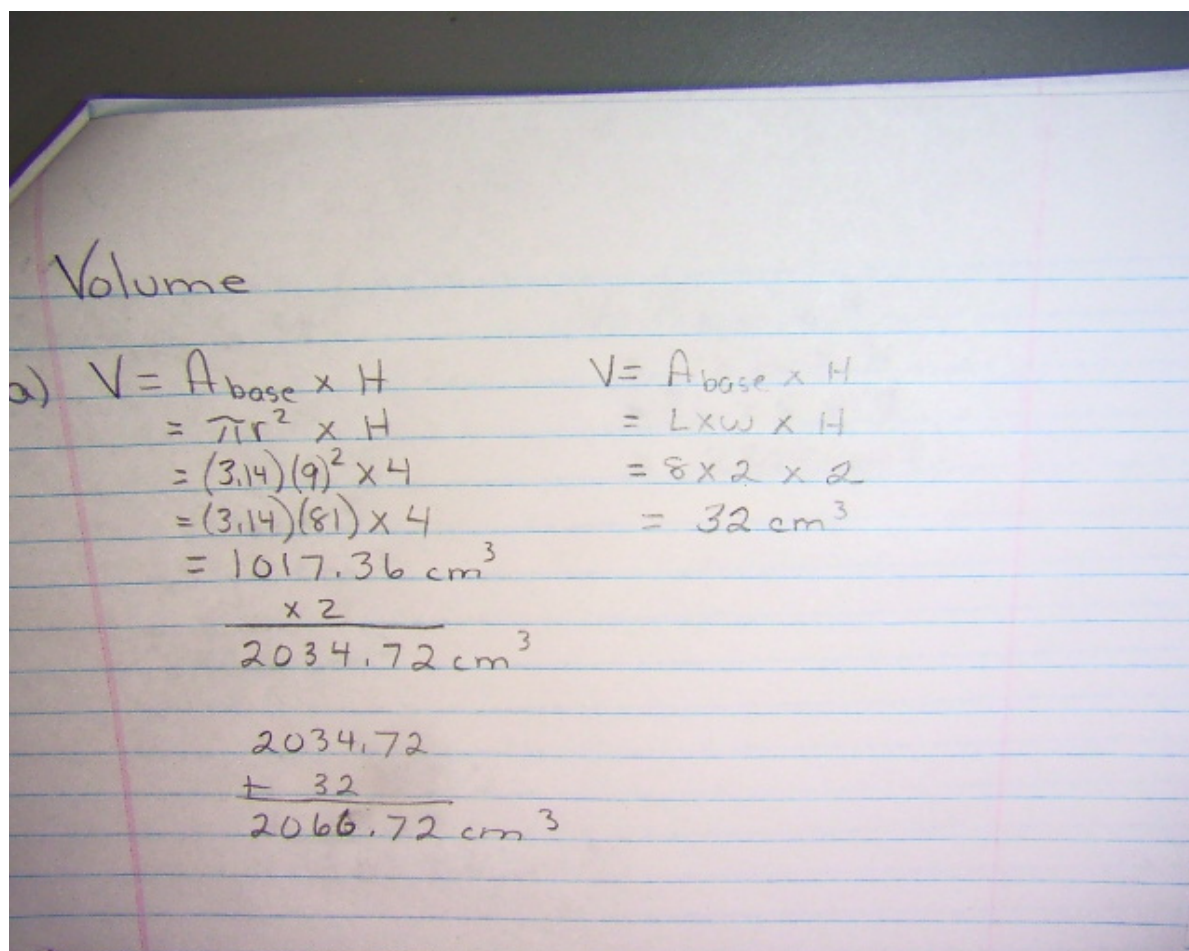
$$SA = 2(8)$$

$$SA = \underline{\underline{16 \text{ cm}^2}}$$

$$\text{④ Total SA} = 1469.52 + 32 - 16$$

$$\underline{\underline{1525.52}}$$

$$SA = 32 + 32 + 8 - 16 \text{ cm}^2$$



a)

cylinder

$$\begin{aligned}
 SA &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(9)^2 + 2(3.14)(9)(4) \\
 &= 2(3.14)(81) + 226.08 \\
 &= 508.68 + 226.08 \\
 &= 734.76 \\
 &\quad \times 2 \\
 &= 1469.52
 \end{aligned}$$

Rectangular Prism

Top/Bottom	Front/Back	Side/Side
$A = L \times w$	$A = L \times w$	$A = L \times w$
$= 8 \times 2$	$= 8 \times 2$	$= 2 \times 2$
$= 16 \times 2$	$= 16 \times 2$	$= 4 \times 2$
$= 32$	$= 32$	$= 8$

Total Surface Area =  $1469.52 + 72 - 8 - 8$   
 $= 1525.52 \text{ cm}^2$

$SA = 32 + 32 + 8$   
 $= 72$

$$\begin{aligned} \text{b) } V &= A_{\text{base}} \times H \\ &= \pi r^2 \times H \\ &= (3.14)(1.5)^2 \times 4 \\ &= (3.14)(2.25) \times 4 \\ &= 28.26 \text{ cm}^3 \end{aligned}$$
$$\begin{aligned} V &= A_{\text{base}} \times H \\ &= L \times W \times H \\ &= 10 \times 9 \times 9 \\ &= 810 \text{ cm}^3 \end{aligned}$$
$$\begin{array}{r} 28.26 \\ + 810 \\ \hline 838.26 \text{ cm}^3 \end{array}$$



b)

$$SA = 2\pi r^2 + 2\pi r h$$

$$= 2(3.14)(1.5)^2 + 2(3.14)(1.5)(4)$$

$$= 2(3.14)(2.25) + 37.68$$

$$= 14.13 + 37.68$$

$$= 51.81$$

Rectangular Prism

Top/Bottom	Front/Back	Side/Side
$A = L \times w$	$A = L \times w$	$A = L \times w$
$= 10 \times 9$	$= 10 \times 9$	$= 9 \times 9$
$= 90$	$= 90$	$= 81$
$\times 2$	$\times 2$	$\times 2$
$= 180$	$= 180$	$= 162$

$$SA = 180 + 180 + 162$$

$$= 522$$

$$\text{Total Surface Area} = 51.81 + 522 - \overset{\text{overlap}}{14.13}$$

$$= 559.68 \text{ cm}^2$$

c)  $V = A_{\text{base}} \times H$

$$\begin{aligned} V &= \pi r^2 \times H \\ &= (3.14)(4)^2 \times 5 \\ &= (3.14)(16) \times 5 \\ &= 251.2 \text{ cm}^3 \\ &\quad \times 3 \\ &= 753.6 \text{ cm}^3 \end{aligned}$$

$V = A_{\text{base}} \times H$

$$\begin{aligned} &= L \times w \times H \\ &= 36 \times 8 \times 8 \\ &= 2304 \text{ cm}^3 \end{aligned}$$
$$\begin{array}{r} 753.6 \\ + 2304 \\ \hline 3057.6 \text{ cm}^3 \end{array}$$

c) Cylinders are identical →

Cylinder

$$\begin{aligned}
 SA &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(4)^2 + 2(3.14)(4)(5) \\
 &= 2(3.14)(16) + 125.6 \\
 &= 100.48 + 125.6 \\
 &= 226.08 \\
 &\quad \times 3 \\
 &= 678.24
 \end{aligned}$$

overlap.  
(3 sections)

$$\begin{aligned}
 &100.48 \\
 &\quad \times 3 \\
 &\hline
 &301.44
 \end{aligned}$$



$$d) V = A_{\text{base}} \times H$$

$$= \pi r^2 \times 22$$

$$= (3.14)(6)^2 \times 22$$

$$= 3.14(36) \times 22$$

$$= 2486.88$$

$$\div 2$$

$$\hline 1243.44 \text{ m}^3$$

$$1243.44$$

$$+ 1584$$

$$\hline 2827.44 \text{ m}^3$$

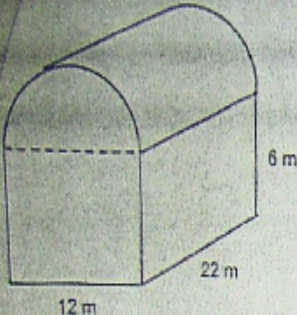
$$V = A_{\text{base}} \times H$$

$$= L \times W \times H$$

$$= 12 \times 22 \times 6$$

$$= 1584 \text{ m}^3$$

Hilroy



Cylinder

$$\begin{aligned} SA &= 2\pi r^2 + 2\pi rh \\ &= 2(3.14)(6)^2 + 2(3.14)(6)(22) \\ &= 2(3.14)(36) + 828.96 \\ &= 226.08 + 828.96 \\ &= 1055.04 \end{aligned}$$

\* But there is only half.

$$\frac{1055.04}{2}$$
$$= 527.52$$

$$2) V = A_{\text{base}} \times H$$

$$= \frac{b \times h}{2} \times H$$

$$= \frac{8 \times 6}{2} \times 9$$

$$= \frac{48}{2} \times 9$$

$$= 24 \times 9$$

$$= 216 \text{ cm}^3$$

$$V = A_{\text{base}} \times H$$

$$= L \times W \times H$$

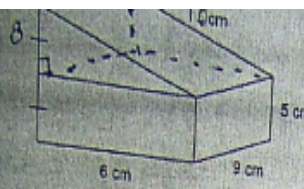
$$= 6 \times 9 \times 5$$

$$= 270 \text{ cm}^3$$

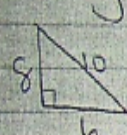
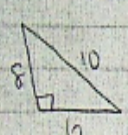
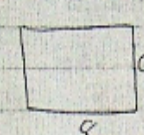
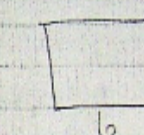
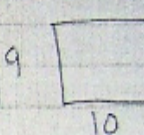
$$\begin{array}{r} 216 \text{ cm}^3 \\ 270 \text{ cm}^3 \\ \hline 486 \text{ cm}^3 \end{array}$$



2)

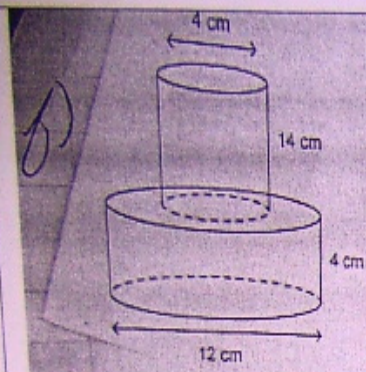


Triangular Prism

				
$A = \frac{b \times h}{2}$	$S_A$	$A = L \times w$	$A = L \times w$	$A = L \times w$
$= \frac{8 \times 6}{2}$	$M_E$	$= 8 \times 9$	$= 6 \times 9$	$= 10 \times 9$
$= \frac{48}{2}$	$= 24$	$= 72$	$= 54$	$= 90$
$= 24$				

$SA = 24 + 24 + 72 + 54 + 90$   
 $= 264$

$$\begin{array}{l} \text{p)} \quad V = A_{\text{base}} \times H \\ \quad = \pi r^2 \times H \\ \quad = (3,14)(2)^2 \times 14 \\ \quad = (3,14)(4) \times 14 \\ \quad = 175,84 \text{ cm}^3 \end{array}$$
$$\begin{array}{l} V = A_{\text{base}} \times H \\ \quad = \pi r^2 \times H \\ \quad = (3,14)(6)^2 \times 4 \\ \quad = (3,14)(36) \times 4 \\ \quad = 452,16 \text{ cm}^3 \end{array}$$
$$\begin{array}{r} 175,84 \\ + 452,16 \\ \hline 628,00 \text{ cm}^3 \end{array}$$



**Top**

$$\begin{aligned}
 SA &= 2\pi r^2 + 2\pi r h \\
 &= 2(3.14)(2)^2 + 2(3.14)(2)(14) \\
 &= 2(3.14)(4) + 175.84 \\
 &= 25.12 + 175.84 \\
 &= 200.96
 \end{aligned}$$

**Bottom**

$$\begin{aligned}
 SA &= 2\pi r^2 + 2\pi r h \\
 &= 2(3.14)(6)^2 + 2(3.14)(6)(4) \\
 &= 2(3.14)(36) + 150.72 \\
 &= 226.08 + 150.72 \\
 &= 376.8
 \end{aligned}$$

Total Surface Area =  $200.96 + 376.8 - 25.12$   
 $= 552.64 \text{ cm}^2$



g.  $V = A_{\text{base}} \times H$

$$= L \times w \times H$$
$$= 4 \times 4 \times 4$$
$$= 64 \text{ cm}^3$$

$V = A_{\text{base}} \times H$

$$= \frac{b \times h}{2} \times H$$
$$= \frac{12 \times 9}{2} \times 5$$
$$= \frac{108}{2} \times 5$$
$$= 54 \times 5$$
$$= 270 \text{ cm}^2$$

$V = 64$

$$\begin{array}{r} +270 \\ \hline 334 \text{ cm}^3 \end{array}$$

9)

cube

### Rectangular Prism

Top/Bottom	Front/Back	Side/Side
$A = L \times W$	$A = L \times W$	$A = L \times W$
$= 4 \times 4$	$= 4 \times 4$	$= 4 \times 4$
$= 16$	$= 16$	$= 16$
$\times 2$	$\times 2$	$\times 2$
—————	—————	—————
overlap $\rightarrow 32$	$32$	$32$

$SA = 32 + 32 + 32$   
 $= 96$

Triangular Prism



H)  $V = A_{\text{base}} \times H$

$= L \times W \times H$

$= 8 \times 8 \times 8$

$= 512$

$\times 2$

$1024 \text{ cm}^3$

$V = A_{\text{base}} \times H$

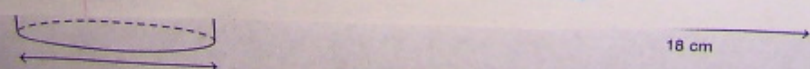
$= L \times W \times H$

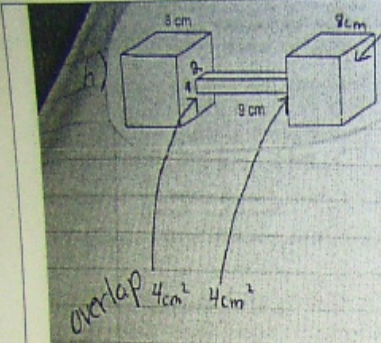
$= 2 \times 1 \times 9$

$= 18 \text{ cm}^3$

$\begin{array}{r} 1024 \\ \underline{18} \\ 1042 \text{ cm}^3 \end{array}$

Hilroy





Rectangular Prism "Cube"

Top/Bottom	Front/Back	Side/Side
$A = L \times W$	$A = L \times W$	$A = L \times W$
$= 8 \times 8$	$= 8 \times 8$	$= 8 \times 8$
$= 64$	$= 64$	$= 64$
$\times 2$	$\times 2$	$\times 2$
<u>128</u>	<u>128</u>	<u>128</u>

SA =  $128 + 128 + 128$   
 $= 384$

---

Other Identical Cube

SA = 384

"Middle rectangular prism"

Top/Bottom	Front/Back	Side/Side
$A = L \times W$	$A = L \times W$	$A = L \times W$
$= 2 \times 9$	$= 1 \times 9$	$= 1 \times 2$
$= 18$	$= 9$	$= 2$
$\times 2$	$\times 2$	$\times 2$
<u>36</u>	<u>18</u>	<u>4</u> (overlap x 2)

SA =  $36 + 18 + 4$   
 $= 58$

TSA =  $58 + 384 - 4 - 4 + 384$   
 $= 818$

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i)  $V = A_{\text{base}} \times H$

$= L \times w \times H$

$= 4 \times 4 \times 8$

$= 128 \text{ cm}^3$

$V = A_{\text{base}} \times H$

$= \pi r^2 \times H$

$= (3.14)(8)^2 \times 6$

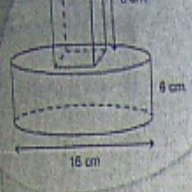
$= (3.14)(64) \times 6$

$= 1205.76$

$$\begin{array}{r} 128 \\ + 1205.76 \\ \hline 1333.76 \text{ cm}^3 \end{array}$$



i)



Rectangular Prism

Top/Bottom	Front/Back	Side/Side
$A = L \times W$	$A = L \times W$	$A = L \times W$
$= 4 \times 4$	$= 4 \times 8$	$= 8 \times 4$
$= 16$	$= 32$	$= 32$
$\times 2$	$\times 2$	$\times 2$
$(32) \text{ overlap.}$	$64$	$64$

$SA = 32 + 64 + 64$   
 $= 160$

Cylinder

$$SA = 2\pi r^2 + 2\pi r h$$

$$= 2(3.14)(8)^2 + 2(3.14)(8)(6)$$

$$= 2(3.14)(64) + 301.44$$

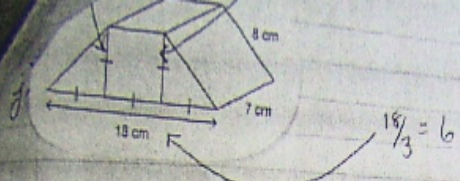
$$= 401.92 + 301.44$$

$$= 703.36$$

$TSA = 160 + 703.36 - 32$   
 $= 831.36 \text{ cm}^2$

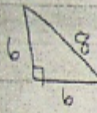
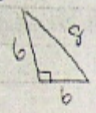
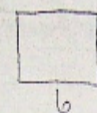

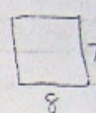
$$\begin{aligned} \text{j) } V &= A_{\text{base}} \times H \\ &= \frac{b \times h}{2} \times H \\ &= \frac{6 \times 6}{2} \times 7 \\ &= \frac{36}{2} \times 7 \\ &= 18 \times 7 \\ &= 126 \\ &\quad \times 2 \\ &\quad \hline &\quad 252 \end{aligned}$$
$$\begin{aligned} V &= A_{\text{base}} \times H \\ &= L \times W \times H \\ &= 6 \times 6 \times 7 \\ &= 252 \end{aligned}$$
$$\begin{array}{r} 252 \\ 252 \\ \hline 504 \text{ cm}^3 \end{array}$$





18 cm  
8 cm  
7 cm  
 $\frac{18}{3} = 6$

### Triangular Prism

				
$A = \frac{bh}{2}$	$S_A$	$A = L \times w$	$A = L \times w$	$A = L \times w$
$= \frac{6 \times 6}{2}$	$M_c$	$= 6 \times 7$	$= 6 \times 7$	$= 8 \times 7$
$= \frac{36}{2}$	$= 18$	$= 42$	$= 42$	$= 56$
$= 18$				

$SA = 18 + 18 + 42 + 42 + 56$   
 $= 176$   
 $\times 2$  (Two Triangular prisms)  
352

### Rectangular Prism

Top/Bottom	Front/Back	Side/Side
$A = L \times w$	$A = L \times w$	$A = L \times w$
$= 6 \times 6$	$= 6 \times 7$	$= 6 \times 7$
$= 36$	$= 42$	$= 42$
$\times 2$	$\times 2$	$\times 2$
<u>72</u>	<u>84</u>	<u>84</u>

$SA = 72 + 84 + 84$   
 $= 240$

Total Surface Area =  $352 + 240 - 42 - 42 - 42 - 42$   
 $= 484 \text{ cm}^2$   $424 \text{ cm}^2$

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